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The Mineral Industry of Pennsylvania in 1962

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The Mineral Industry of Pennsylvania

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By Charles C. Yeloushan,[1] Mary E. Otte,[2] and Robert E. Ela[3]

COMMODITIES produced by the mineral industry of Pennsylvania in 1962 totaled $823 million in value, an increase of $18 million over that of 1961. Mineral fuels accounted for 63 percent of the total; however, their value decreased by $6.4 million. Mineral commodities that increased in total value were portland cement, bituminous coal, cobalt, iron ore, lime, peat, pyrites, sand and gravel, stone, sericite schist, and zinc.

Employment and Injuries.—As shown in table 2 for selected mineral industries, employment continued to decline in the anthracite, bituminous coal, cement, and lime industries. Employment improved somewhat in the clays, sand and gravel, and stone industries because of greater building and construction activity.

Fatalities in the bituminous coal industry increased considerably during 1962, because of a major disaster that claimed the lives of 37 men. It occurred on December 6 in the Robena No. 3 mine of United States Steel Corp. in Greene County. Among the other 22 fatalities, 16 occurred underground, 2 on the surface, and 4 at strip operations. Roof falls accounted for seven of the underground fatalities. Nonfatal lost-time injuries decreased from 1,129 in 1961 to 950.

Twenty-six fatalities occurred in the anthracite industry, seven more than in 1961. Underground fatalities increased from 14 to 18, surface operations from 2 to 5, and strip operations recorded 3 fatalities, the same as in 1961. Of the 18 underground fatalities, 8 were from falls of roof, face, or rib, 5 from suffocation, 2 from transportation, and 1 each from fall of person, inrush of water, and rush of material. Strip and surface fatalities were from miscellaneous causes. Nonfatal lost-time injuries decreased from 1,295 in 1961 to 1,135.

The stone industry recorded 10 fatalities, 9 more than in 1961. Other fatalities occurred in the cement and sand and gravel industries with one each.

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TABLE 1.—Mineral production in Pennsylvania [1]

Mineral	1961		1962	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:				
Portland—thousand 376-pound barrels	36,635	$124.506	38,463	$127,969
Masonry—thousand 280-pound barrels	2,678	7,232	2,565	7,105
Clays [2]—tbousand short tons	2,999	14,402	2,893	12,815
Coal:				
Anthracite—do	17,446	140,338	16,894	134.094
Bituminous—do	62,652	323,758	65,315	331,298
Gem stones	(3)	(3)	(3)	4
Lime—thousand sbort tons	[4] 1,093	[4] 16,428	1,104	16,647
Natural gas—million cubic feet	100,427	29,526	90,053	24,494
Natural gas liquids:				
Natural gasoline—thousand gallons	1,272	74	1,350	75
LP gases—do	1,453	115	1,521	112
Peat—short tons	27,993	291	32,936	369
Petroleum (crude)—thousand 42-gallon barrels	5,643	26,579	[5] 5,225	[5] 23,878
Sand and gravel—tbousand sbort tons	12,594	19,766	14,419	23,587
Stone—do	41,834	71,344	48,144	82,087
Zinc [6] (recoverable content of ores, etc.)—short tons	23,428	5,408	24,308	5,652
Value of items that cannot be disclosed: Cobalt, copper, gold, graphite (1961), iron ore, mica, pyrites, sericite schist, silver, and tripoli		25,356		32,966
Total		[4] 805,128		823,152

[1] Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2] Excludes kaolin: included with "Value of items that cannot be disclosed."
[3] Weight not recorded.
[4] Revised figure.
[5] Preliminary figure.
[6] Recoverable zinc valued at the yearly average price of Prime Western slab zinc, East St. Louis market. Represents value established after transportation, smelting, and manufacturing charges have been added to the value of ore at the mine.

Three underground mines in Pennsylvania were winners in the 38th Annual National Safety Competition. Each winning operation achieved the best safety record in one of the major categories of competition during 1962. Each received one of the famed "Sentinels of Safety" trophies for a year. In addition, all employees and officials at winning operations received individual "Certificates of Accomplishment in Safety." On the basis of records submitted, Maple Creek Mine, United States Steel Corp., New Eagle, Washington County, won the top award for underground bituminous coal mines for operating 433,378 man-hours without a disabling injury. This was the second consecutive top award for this mine in its fourth year of continuous competition. It won fourth place in its group in 1960. Bellefonte mine, National Gypsum Co., Bellefonte, Centre County, was the winner in the underground nonmetal mines category for operating 256,667 man-hours without a disabling work injury. This was the second successive year and the fourth time this operation had won in 14 years of continuous competition. It received the trophy in 1949, 1957, and 1961 and honorable mention in 1958 and 1959. Penag mine, Penag Coal Co., Good Springs, Schuylkill County, was the winner in the underground anthracite mine category for operating 163,037 man-hours in 1962 with 18 work injuries causing a loss of 78 days owing to disability. It has competed regularly since 1950 and won top honors in 1956 and honorable mention in 1950, 1951, 1955, 1958, and 1960.

Legislation and Government Programs.—A resource program was initiated to study the problems involved in establishing and maintain-

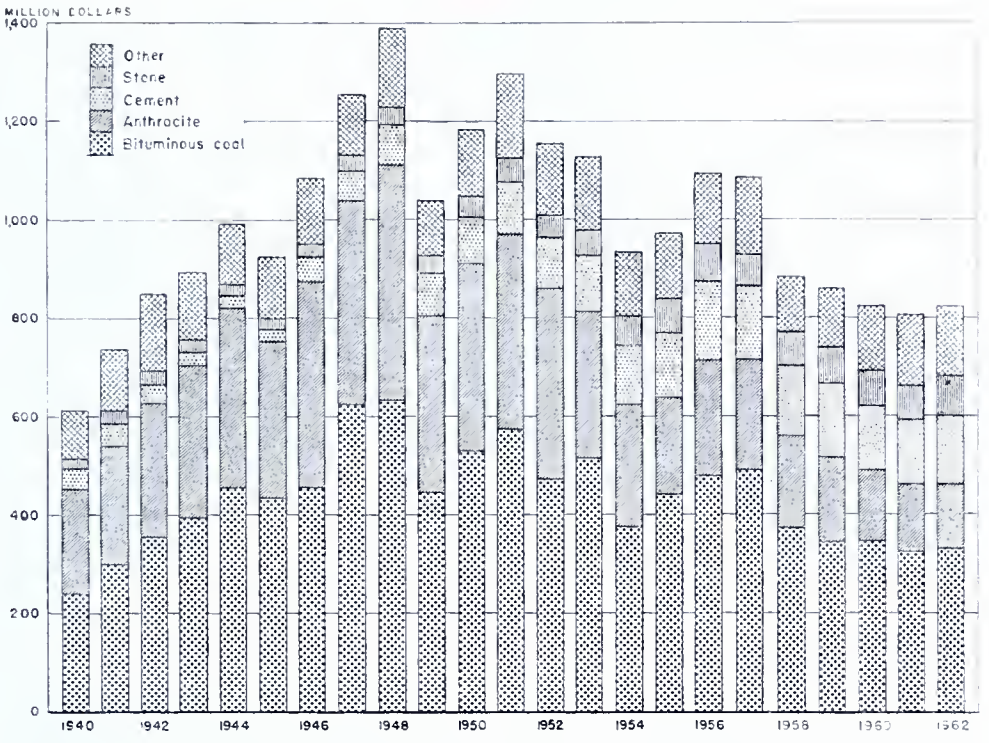

FIGURE 1.—Value of bituminous coal, anthracite, cement, and stone, and total value of mineral production in Pennsylvania, 1940–62.

ing a complete file on the location of active and abandoned bituminous coal mine workings in the Appalachian Region. From this, a program was developed to make a comprehensive investigation of the extent and economic minability of remaining bituminous coal deposits on a county-by-county basis. Preliminary investigation commenced in Butler County.

TABLE 2.—Employment and injuries for selected mineral industries

Industry	1961		1962 [1]				
	Average number of men working	Total man-hours	Average number of men working	Total man-hours	Total number of lost-time injuries		Number of injuries per million man-hours
					Fatal	Nonfatal	
Anthracite	15,792	22,424,285	14,010	18,220,000	26	1,135	63.72
Bituminous coal	27,469	43,152,926	21,700	37,720,000	59	950	26.75
Cement [2]	4,047	9,091,344	3,739	8,499,970	1	15	1.88
Clays	448	684,831	558	967,410	-------	24	24.81
Lime [2]	1,177	2,486,350	1,081	2,314,220	-------	32	13.83
Sand and gravel	1,392	2,475,592	1,416	2,659,856	1	61	23.31
Stone [3 4]	3,725	7,188,860	3,933	7,697,742	10	204	27.80

[1] Preliminary figures.
[2] Includes quarries or pits producing raw materials used in manufacturing cement or lime for captive operations.
[3] Includes quarry or open-pit employees as well as crushing and screening and rock dressing operations.
[4] Excludes quarries or pits producing limestone from captive operations used in manufacturing cement or lime.

REVIEW BY MINERAL COMMODITIES

MINERAL FUELS

Coal (Anthracite).—Production of Pennsylvania anthracite totaled 16.9 million short tons valued at $134 million, a decline of 3 percent and 4 percent, respectively, from 1961.

Freshly-mined anthracite from underground mines accounted for 40 percent of the total tonnage. Production from underground mines was 2 percent less than in 1961. Hand-loaded underground coal totaled 3.6 million tons, compared with 3.4 million tons in 1961. Mechanically loaded underground coal totaled 3.1 million tons, compared with 3.4 million tons in 1961. In all, 128 scraper loaders (4 less than in 1961), 34 mobile loaders (7 more than in 1961), and 536 conveyors and pit-car loaders (80 less than in 1961) were used underground to load anthracite mechanically.

Production from strip pits accounted for 40 percent of the total anthracite tonnage and totaled 6.8 million tons, a 6 percent decrease from 1961 output. Production from culm banks totaled 2.7 million tons (16 percent of total anthracite production), a slight increase over that of 1961. Operations were active in Lehigh, Schuylkill, and Wyoming regions.

Anthracite was dredged from the Schuylkill and Susquehanna Rivers in the Schuylkill region. Production totaled 727,000 tons valued at $2.5 million. Of the total production, 629,000 tons came from the Susquehanna River and 98,000 tons from the Schuylkill River.

Of the total anthracite produced, 7.9 million tons was shipped by rail, 8.8 million tons by truck, and the remainder retained as colliery fuel. The average value of anthracite shipped by rail was $8.06 per ton; by truck, $7.91 per ton; and $3.10 per ton for colliery fuel. Wholesale price indexes (1957–59 equals 100), f.o.b. mines, were 90.9 for chestnut, 92.8 for pea, 92.2 for buckwheat No. 1, and 107.6 for buckwheat No. 3.

Schuylkill County continued to lead other anthracite-producing counties with 6.2 million tons. Luzerne County was second with 6.1 million tons followed by Northumberland with 1.6 million tons, and Lackawanna with 1.1 million tons. Other counties producing anthracite were Carbon, Columbia, Dauphin, Berks, Lancaster, Lebanon, Snyder, Sullivan, Susquehanna, and Wayne.

Coal (Bituminous).—Production of bituminous coal from underground, strip, and auger operations totaled 65.3 million tons, a 4 percent increase over that of 1961. Production from underground mines increased 3 percent; from strip mines, 7 percent; and from auger mines, 35 percent. Mines producing 1,000 tons or more numbered 1,177, compared with 1,220 in 1961. The number of underground mines decreased by 40, strip mines by 9, while auger mines increased by 6.

Underground operations accounted for 65 percent of the total production. Continuous-mining machines accounted for 29.9 million tons; 315 continuous miners loaded 27.1 million tons into shuttle cars, and 40 continuous miners loaded 2.8 million tons onto conveyors. Seventy-seven mobile loaders were used with these continuous mining machines. Mobile loading machines were the principal

coal-moving equipment, with 190 machines loading 8 million tons into shuttle cars, 58 machines loading 1.8 million tons into mine cars, and 13 machines loading 118 thousand tons onto conveyors. Twenty-seven duckbills, self-loading conveyors, and scraper loaders accounted for 186,000 tons. Hand-loaded face conveyors totaled 235 and accounted for 931,000 tons. Cutting machines numbered 748 and cut 12 million tons of coal. Underground haulage included the following: 1,628 electric-trolley, 83 electric-battery, and 24 other type locomotives; 31 rubber-tired tractors; 34,468 rail and 28 rubber-tired mine cars; 841 miles of main line and 332 miles of other rail track; 912 cable-reel and 27 battery shuttle cars; 10 shuttle buggies; and 360 conveyors (average conveyor length 1,637 feet).

Strip mines accounted for 34 percent of the total production. Bituminous coal was stripped and loaded using electrical, diesel-electric, diesel, and gasoline power shovels and draglines. Of the 946 power shovels in use (5 more than in 1961), 880 had a bucket capacity of less than 3 cubic yards; 60, 3 to 5 cubic yards; 4, 6 to 12 cubic yards; and 2, more than 12 cubic yards. Of 411 draglines used, 113 had a bucket capacity of less than 3 cubic yards; 176, 3 to 5 cubic yards; 110, 6 to 12 cubic yards; and 12, over 12 cubic yards. Twenty-nine carryall scrapers were used (16 more than in 1961); 6 had a capacity of less than 3 cubic yards; 10, 3 to 5 cubic yards; 7, 6 to 12 cubic yards; and 6, over 12 cubic yards. In addition, 767 bulldozers, 114 horizontal power drills, 138 vertical power drills, and 1,561 trucks or tractor trailers, having an average capacity of 13 tons per unit, were used.

Sixty augers operated in 56 auger mines. Other equipment used at auger operations included 10 bulldozers, 6 power drills, and 64 trucks or tractor-trailers, having an average capacity of 13 tons per unit.

Of the total bituminous coal production of 65.3 million tons; 50.9 million tons was shipped by rail or water; 12.9 million tons was shipped by truck; 41.6 million tons was sold in the open market at an average price of $4.27 per ton; and 23.7 million tons, not sold in the open market, had an average value of $6.49 per ton. The average values were $5.84 per ton for underground coal; $3.66 per ton for strip coal; and $3.13 per ton for auger coal.

Ninety-one preparation plants (10 more than in 1961) produced 39.7 million tons of clean coal from 51.2 million tons of raw coal. Of the total clean coal, 35.4 million tons came from underground mines, 4.3 million tons from strip mines, and 20,800 tons from auger mines. Wet washing using jigs accounted for 7.2 million tons of clean coal; other methods of wet washing accounted for 26.4 million tons; and pneumatic methods accounted for 6.1 million tons.

Total production of mines having crushing facilities was 45.3 million tons, of which 32 million tons was crushed and 33.6 million tons mechanically cleaned. Total production of mines having treating facilities was 20.4 million tons, of which 359,000 tons was treated with calcium chloride, 4 million tons with oil, 1.1 million tons with both calcium chloride and oil, and 560,000 tons with all other materials.

Coke and Coal Chemicals.—Pennsylvania continued to be the leading producing State for beehive and oven coke. Production from oven-coke operations increased 5 percent. Production from beehive coke ovens decreased 15 percent.

Twelve oven-coke plants with 3,720 slot-type ovens were in existence at yearend, the same as at the end of 1961. Coke-oven operations produced 14 million short tons of coke from the carbonization of 20 million tons of coal for a yield of 69.84 percent. The average value of oven coke at the ovens was $16.36 per short ton, compared with $16.14 per ton in 1961. Of the oven coke made in Pennsylvania, producers used 13.1 million tons in blast furnaces and 24,000 tons for other purposes. Sales were 295,000 tons to blast-furnace plants, 181,000 tons to foundries, 140,000 tons to other industrial plants, and 167,000 tons for residential heating.

Twenty-one beehive coke plants with 3,918 ovens were in existence at yearend, compared with 27 plants and 4,493 ovens at the end of 1961. Beehive operations produced 384,800 tons of coke from the carbonization of 630,300 tons of coal, for a yield of 61.06 percent. The average value of beehive coke at the ovens was $13.67 per ton, compared with $13.76 per ton in 1961. Of the beehive coke produced in Pennsylvania, producing companies used the major portion of the output in their own blast furnaces, but some was sold to outside blast-furnace plants, foundries, other industrial plants, and also for residential heating.

Production of breeze recovered at coke plants totaled 649,000 tons valued at $4.5 million. Most of the breeze tonnage was used by the producers in steam plants, agglomerating plants, and other industrial uses. A small quantity was sold. Yearend stock of breeze totaled 220,000 tons.

Coal delivered during the year to Pennsylvania oven-coke plants totaled 19.7 million tons, of which 10.7 million tons was produced in Pennsylvania; 7.2 million tons in West Virginia; 1 million tons in Virginia; and 756,000 tons in Kentucky. The coal received by coke-oven operators in Pennsylvania was 71 percent high volatile, 10 percent medium volatile, and 19 percent low volatile coal.

Coal-chemical materials produced at coke-oven installations in Pennsylvania included 210 billion cubic feet of coke-oven gas, 199,000 tons of ammonium sulfate equivalent, 196 million gallons of coke-oven tar, and 62,342,390 gallons of crude light oil, from which was derived 32,892,301 gallons of benzene, 8,545,043 gallons of toluene, 3,038,864 gallons of xylene, and 2,180,857 gallons of solvent naphtha.

Peat.—Production of peat increased 18 percent in total tonnage and 27 percent in total value over that of 1961. Peat was produced in Erie, Lawrence, Luzerne, Monroe, and Wayne Counties. The leading producer was Wayne County. Humus peat, sold in bulk, comprised most of the tonnage. Some moss and reed-sedge peat were also produced. Peat was sold in packages and in bulk.

Petroleum and Natural Gas.—Production of crude petroleum decreased from 5.6 million barrels valued at $26.6 million in 1961 to 5.2 million barrels valued at $23.9 million. The average value per barrel of crude oil remained constant throughout 1962 at $4.63 per barrel in the northern or Bradford district, $4.35 per barrel in the middle or Venango district, and $4.08 per barrel in the southwestern district.

Production of natural gas decreased from 100.4 billion cubic feet valued at $29.5 million in 1961 to 90.1 billion cubic feet valued at $24.5 million.

Exploration resulted in the discovery of one new gas field, three new gas pools, and one deeper gas pool.[4] One of the new gas pools was discovered by reactivating an old well, abandoned as a dry hole, and fracturing the producing horizon. Other fields and pools were extended by development drilling.

The outstanding discovery was the Five Forks field in Bedford County in a highly folded area of the Valley and Ridge province. Other important discoveries were the Kastle pool in the Medina play in Crawford County, the Newfield pool on the Harrison anticline in Potter County, the Hribal pool on the northwestern flank of the Chestnut Ridge anticline in Westmoreland County, and the Kahl pool on the Fayette anticline in Westmoreland County. All the discoveries were in formations of Middle Devonian Age or older. The greatest amount of deep drilling (Middle Devonian or older) occurred in the Whippoorwill field in Elk and Cameron Counties, where 15 gas wells and 3 dry holes were completed during 1962. There were 668 new wells drilled and 40 wells deepened. Of the 668 new wells, 630 were in proven fields, and 38 were exploratory tests. Included in the 38 exploratory tests was a reactivated well, which discovered a new pool, and an unsuccessful shallow (Upper Devonian or younger) wildcat. The remaining 36 wells were all deep wildcats. Of the 630 proven field wells, 341 were drilled outside of underground gas storage and secondary recovery projects, 286 wells in secondary recovery projects, and 3 wells in gas storage fields. Of the 341 development wells outside secondary recovery projects, 97 were oil wells, 189 gas wells, and 55 dry holes. The total footage drilled during 1962 was 1,716,482 feet.

Out of 102 deep wells (Middle Devonian or older) drilled during 1962, 36 wells were wildcats. This is one less wildcat well than was drilled in 1961. Crawford and Erie Counties in Northwestern Pennsylvania had the greatest density of deep drilling with 17 deep wells completed in each county. Cameron County was next with 16 deep wells. The 102 deep wells consisted of 56 gas wells, 2 gas storage wells, and 44 dry holes. Two old deep wells were reactivated and drilled deeper. The total deep footage, including the two old wells drilled deeper, amounted to 583,288 feet. Rotary tools completed 81 deep wells during the year, most of them with air rotary, and 21 were completed with cable tools. There were 564 shallow-sand wells completed in 1962. The total shallow footage drilled, including 38 wells deepened was 1,133,194 feet. Indiana County had the greatest activity in the shallow-sand gas belt. Thirty-one new gas wells were completed in the county, of which 28 were fractured. Armstrong County had 29 new gas wells; Westmoreland, 26; and Clarion, 22.

A total of 97 oil wells was drilled outside the secondary recovery projects. The greatest number of oil wells was drilled in Warren County, with 59 completed. Venango County was second with 20 oil wells. The increase in drilling in the Warren area was attributed to the success of fracturing Glade sand wells. At the end of the year 26 Glade sand wells had been drilled and fractured. Of these oil wells, 17 were drilled in the Warren area, and 9 in the Sugar Grove area.

[4] Lytle, William S., Addison S. Cate, William G. McGlade, and Walter R. Wagner. Oil and Gas Developments in Pennsylvania in 1962. Pennsylvania Geol. Survey, Prog. Rept. 165, 1963, 44 pp.

Exploratory tests totaled 38, drilling a total of 235,146 feet. Among the exploratory tests, 5 were successful, and 33 were dry, giving a success ratio of 1 in 7.6.

Seismic crews logged 83 weeks, a decrease of 38 percent from the seismic activity in 1961. Gravity crews logged 7 weeks in Susquehanna, Lackawanna, and Monroe Counties. Geological field parties were also active, especially in the Valley and Ridge province.

Proved reserves of crude oil at yearend were estimated at 96.7 million barrels. Proved recoverable reserves of natural gas in Pennsylvania at yearend were estimated at 1,181 billion cubic feet. Natural gas held in underground reservoirs for storage purposes at yearend totaled 453 billion cubic feet. The total reservoir capacity for the storage of natural gas was estimated at 512.1 billion cubic feet, compared with 497 billion cubic feet in 1961.

Natural Gas Liquids.—Total production of natural gas liquids increased from 2.7 million gallons in 1961 to 2.9 million gallons. Of the total, natural gasoline and cycle products accounted for 1.4 million gallons, and liquefied petroleum gases and ethane (manufactured at natural gasoline plants) accounted for 1.5 million gallons. Average value for natural gasoline and cycle products decreased from $0.058 per gallon in 1961 to $0.056, and for liquefied petroleum gases and ethane from $0.079 per gallon in 1961 to $0.074.

Estimated proved reserves of natural gas liquids at yearend totaled 1.5 million barrels, compared with 2.1 million barrels at the end of 1961. Estimated proved reserves of liquid hydrocarbons at yearend totaled 98 million barrels, compared with 104 million barrels at the end of 1961.

NONMETALS

Cement.—Production of portland and masonry cements increased 8 percent and 1 percent, respectively. Shipments of portland cement increased 5 percent and had an average value of $3.33 per barrel compared with $3.40 per barrel in 1961. Masonry cement shipments decreased 4 percent and had an average value of $2.77 per barrel compared with $2.70 per barrel in 1961. Portland cement was converted into prepared masonry cement at six plants at various locations throughout the State during 1962 and totaled 268,900 barrels, a 14-percent decrease from 1961 output.

The portland cement industry operated at 74 percent of annual finished-cement capacity. There were 22 active plants. Dry process plants accounted for 69 percent of the capacity and wet process plants, 31 percent. Electrical energy consumption was 972 million kilowatthours, a 9-percent increase over that of 1961. Seventy-nine percent of the electrical energy consumed was purchased from public utility companies. Portland cement stocks increased 15 percent during 1962, totaling 6.2 million barrels at yearend.

Cement rock and limestone were the principal raw materials used in manufacturing portland cement, and accounted for 92 percent of the total raw material used with tonnages of 8.2 million and 3.3 million, respectively. Other raw materials included gypsum (321,800 tons), slag (248,600 tons), and sand (208,000 tons), accounting for an additional 6 percent of the total. Smaller quantities of clay, shale, iron ore, slate, mill scale, pyrites, sludge, iron cinders, carbon black,

and air-entraining compounds composed the remaining tonnage used as raw material.

Shipments of finished portland cement were distributed to consumers in Pennsylvania, 44 other States, the District of Columbia, and foreign countries. Destinations of most of the shipments were as follows: 35 percent to Pennsylvania; 22 percent to New Jersey; 17 percent to New York; 6 percent each to Ohio and Connecticut; 4 percent to Maryland; 3 percent to Massachusetts; and 2 percent each to Delaware and Virginia.

Shipments of portland cement by type of customer were as follows: 20.9 million barrels to ready-mixed concrete companies, 7.5 million barrels to concrete product manufacturers, 6 million barrels to building material dealers, 2.9 million barrels to highway contractors, 680,000 barrels to other contractors, 416,000 barrels to miscellaneous customers, and 15,000 barrels to Federal, State, and local government agencies.

Shipments of prepared masonry cement were distributed to consumers in Pennsylvania, 25 other States, and the District of Columbia. Destinations of most of the shipments were as follows: 38 percent to Pennsylvania, 19 percent to New Jersey, 16 percent to New York, and 13 percent to Ohio. Masonry cement production was reported by 16 of the portland cement plants. Northampton, Lawrence, and Lehigh Counties were the principal producing counties.

TABLE 3.—Portland cement shipments, by counties

County	Number of plants in 1962	1961		1962	
		Barrels	Value	Barrels	Value
Lehigh	4	6,606,106	$21,718,671	6,580,842	$21,041,268
Northampton	10	18,156,481	61,222,857	19,324,721	63,525,400
Allegheny	2	6,391,919	21,831,403	6,397,052	21,250,020
Lawrence	2				
Berks	1	5,480,152	19,732,766	6,160,200	22,152,731
Butler	1				
Montgomery	1				
York	1				
Total	22	36,634,658	124,505,697	38,462,815	127,969,419

Clays.—Production of clays declined for the second consecutive year. Increased consumption of clay for cement and lightweight aggregates was not sufficent to overcome the decrease in consumption for refractories and heavy clay products. Clay production was reported from 126 operations, of which 111 were strictly clay mines. Other operations were in conjunction with coal and limestone mining. Of the clay mines reported, 89 were open pit and 22 were underground. Fire clay was used principally in manufacturing refractory firebrick and block and heavy clay products and smaller quantities were used as filler. Thirty-four percent of the fire clay sold and used was mined underground. Clearfield County was the leading county for the production of fire clay, followed by Armstrong and Lawrence Counties. Miscellaneous clay tonnage increased 5 percent from 1961. Higher demand for miscellaneous clay for heavy clay products, lightweight aggregate, and cement were factors accounting for the increase. All

of the miscellaneous clay came from open pits. Schuylkill County was the leading producer of miscellaneous clay, followed in decreasing order by Berks and Lawrence Counties.

Production of kaolin, which decreased 4 percent in tonnage from 1961, was used in the manufacture of firebrick and block, portland cement, and heavy clay products. Kaolin was recovered from open pits in Blair and Cumberland Counties.

TABLE 4.—Clays sold or used by producers, by kinds and uses [1]

Use	Fire clay		Miscellaneous clay	
	1961	1962	1961	1962
Refractories:				
Firebrick and block	684,376	611,313	----------	----------
Fire clay mortar	14,109	13,253	----------	----------
Clay crucibles	13,098	2,012	----------	----------
Foundries and steelworks	58,273	57,157	(2)	(2)
Heavy clay products	606,341	516,826	(2)	1,246,641
Portland and other hydraulic cements	----------	----------	136,430	(2)
Undistributed	[3] 88,423	[3] 75,584	[4] 1,398,410	[4] 370,676
Total	1,464,620	1,276,145	1,534,840	1,617,317

[1] Excludes kaolin.
[2] Included with "Undistributed" to avoid disclosing individual company confidential data.
[3] Includes high-alumina brick, glass refractories, other refractories, rubber (1962), and insecticides and fungicides (1962).
[4] Includes art pottery, flowerpots and glaze slip, floor and wall tile (1961), lightweight aggregate, linoleum and oilcloth, other uses, and items indicated by footnote 2.

TABLE 5.—Clays sold or used by producers in 1962, by counties

County	Short tons	Value	Types of clay
Adams	75,900	$38,400	Miscellaneous clay.
Allegheny	86,254	449,606	Do.
Armstrong	203,649	1,892,926	Fire clay.
Butler	14,346	21,519	Miscellaneous clay.
Clarion	82,927	359,633	Fire clay, miscellaneous clay.
Clearfield	361,912	2,570,455	Do.
Columbia	14,095	25,372	Miscellaneous clay.
Fayette	68,331	248,609	Fire clay, miscellaneous clay.
Lawrence	372,827	623,469	Do.
Montgomery	87,156	133,956	Do.
Snyder	19,982	24,977	Miscellaneous clay.
Somerset	58,240	(1)	Fire clay.
Undistributed [2]	1,447,843	6,425,951	
Total [3]	2,893,462	12,814,873	

[1] Figure withheld to avoid disclosing individual company confidential data; included with "Undistributed."
[2] Includes Beaver, Berks, Blair, Bucks, Cameron, Centre, Chester, Clinton, Dauphin, Elk, Greene, Huntingdon, Indiana, Jefferson, Lancaster, Luzerne, McKean, Monroe, Northumberland, Schuylkill, and York Counties, and item indicated by footnote 1.
[3] Incomplete total; excludes kaolin produced in Blair and Cumberland Counties.

Gem Stones.—Small quantities of semiprecious gem stones and mineral specimens continued to be collected in eastern Pennsylvania by hobbyists and members of various local and out-of-State mineral and lapidary clubs. Activity was centered in Chester and Montgomery Counties. Mineral specimens were also reported as having been collected in Lancaster, Lehigh, Luzerne, Monroe, and Northampton Counties. Minerals collected included garnet, jasper, quartz, marcasite, galena, malachite, flint, zeolite, hematite, stilbite, natrolite, and deweylite.

Graphite.—Artificial graphite was produced at a plant in Elk County and sold to principal basic steel manufacturers, iron and steel foundries, and to the electrochemical industry. The operation recovering natural graphite from schist in Chester County was inactive during 1962.

Iron Oxide Pigments.—Sulfur mud continued to be produced as a crude iron oxide pigment material in Cambria County and shipped to finishing plants in Northampton and Carbon Counties. Production decreased 35 percent from that of 1961, because of a lack of orders.

Finished natural and manufactured iron oxide pigments continued to be produced at two plants in Northampton County and one plant in Carbon County. Production increased 8 percent in total tonnage and 7 percent in total value from 1961. Finished pigment products included magnetite, manufactured magnetic black, natural and manufactured brown iron oxide, raw and burnt sienna, raw and burnt umber, Vandyke brown, natural and manufactured red iron oxide, Venetian red, pyrite cinder, manufactured yellow iron oxide, ocher, and others. Manufactured red iron oxide accounted for most of the total market value for pigments. Pennsylvania continued to be the leading State in the production of finished natural and manufactured iron oxide pigments.

Lime.—Production of quicklime and hydrated lime increased slightly over that of 1961. Quicklime accounted for 67 percent of the total lime sold. Shipments of quicklime for construction, agricultural, refractory, and chemical purposes decreased 9 percent. Shipments of hydrated lime for construction, agricultural, and chemical purposes increased 28 percent.

Sixteen companies, 4 less than in 1961, operated 18 plants in 14 counties. Centre County continued to be the leading county producing 46 percent of the State lime shipments. Centre, York, Lebanon, Butler, Chester, and Montgomery Counties, in decreasing order, each produced lime valued in excess of $1 million. Most of the lime was consumed within the State (57 percent), but large quantities were shipped to New York (9 percent), New Jersey (8 percent), Ohio (5 percent), Delaware (4 percent), and Maine (2 percent).

TABLE 6.—Lime sold by producers, by counties

County	1961		1962	
	Short tons	Value	Short tons	Value
Centre	500,707	$6,746,673	502,752	$6,732,596
Dauphin	7,900	126,400	8,000	128,000
Franklin	1,557	11,833		
Fulton	593	5,337		
Juniata			1,482	15,190
Lancaster	1,198	16,772	841	10,077
Lebanon	142,000	2,070,000	137,000	1,998,000
Mifflin	4,349	42,521	(1)	(1)
Northumberland	417	3,450	337	3,031
Snyder	739	6,073	1,135	9,202
Undistributed [2]	433,242	7,398,581	452,009	7,750,806
Total	[3] 1,092,702	[3]16,427,640	1,103,556	16,646,902

[1] Figure withheld to avoid disclosing individual company confidential data.
[2] Includes Armstrong, Bedford, Butler, Chester, Montgomery, and York Counties, and county indicated by footnote 1.
[3] Revised figure.

Magnesium Compounds.—Precipitated magnesium carbonate was produced from raw dolomite at a plant in Montgomery County. Production was considerably higher than in 1961, but the company reported the plant closed at yearend because of unprofitable operations. Extralight magnesium oxide was produced from precipitated magnesia at the same plant for manufacturing rubber and magnesium oxide insulation.

Mica.—Scrap mica was produced and processed at an operation in York County. Mica was ground with air separation to 160- and to 325-mesh size. The 160-mesh mica was used as a mold lubricant in the rubber industry and in welding rods; the 325-mesh size was used in paints and plastics.

Perlite (Expanded).—Crude perlite, mined in Colorado, was expanded at plants in Allegheny, Delaware, Lehigh, Montgomery, and York Counties. Sales of expanded perlite totaled 14,362 tons valued at $935,547, a decrease from 1961. The building plaster industry consumed most of the expanded perlite production, but other uses included loose-fill insulation, concrete aggregate, soil conditioning, filler, formed insulation, soakup, and filter aid.

Pyrites.—Pyrites were recovered as a byproduct concentrate of magnetic ore by flotation at two concentrators in Lebanon and Berks Counties. Production of pyrites increased 30 percent over 1961. The pyrites were used for making sulfuric acid.

Sand and Gravel.—Production of sand and gravel totaled 14.4 million short tons, the highest level since 1953. Production was reported from 46 of the 67 counties. Sand and gravel for building and paving purposes totaled 12.3 million tons. The operations reporting sand and gravel production numbered 114, of which 35 produced over 100,000 tons. Production from these 35 plants totaled 11.6 million tons and represented more than 80 percent of the State total. Bucks County continued as the leading producing county followed by Erie, Armstrong, and Huntingdon. Industrial sand was produced in 17 counties, led by Huntingdon and Mifflin Counties. Seventy-two percent of the total sand and gravel tonnage was transported by truck. Other methods of shipment were by waterway and railroad. Pennsylvania ranked 18th in U.S. sand and gravel production.

Stone.—Total production of stone increased 15 percent in tonnage and value from 1961. The increase was caused mainly by the greater demand for crushed stone for concrete and roadstone uses in building and highway construction.

Stone was produced in 49 counties, 1 more than in 1961. Northampton County continued to be the leading stone-producing county. Counties producing over $3 million were, in decreasing order, Northampton, Montgomery, Adams, York, Berks, Lancaster, Chester, Centre, Lawrence, and Bucks Counties. In addition, Blair, Bulter, Cumberland, Dauphin, Delaware, Fayette, Franklin, Huntingdon, Lebanon, Lehigh, and Westmoreland Counties each produced over $1 million worth of stone.

Production of basalt (traprock) totaled 3.3 million tons valued at $6.5 million, increases of 1 and 7 percent, respectively, over those of 1961. Dimension basalt stone was produced in Bucks, Chester, and Montgomery Counties. Crushed basalt stone was produced in Adams, Berks, Bucks, Chester, Dauphin, Delaware, and Montgomery Counties.

TABLE 7.—Sand and gravel sold or used by producers, by classes of operations, and uses

(Thousand short tons and thousand dollars)

Class of operation and use	1961		1962	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Molding	148	$427	141	$405
Building	3,820	5,102	4,493	6,511
Paving	1,853	2,657	2,562	3,777
Fire or furnace	227	470	169	386
Engine	65	172	(1)	(1)
Fill	80	59	31	30
Undistributed [2]	1,096	3,815	1,529	4,762
Total	7,289	12,702	8,925	15,871
Gravel:				
Construction:				
Building	3,175	4,170	2,510	3,433
Paving	1,941	2,747	2,748	4,070
Fill	93	63	130	83
Undistributed [3]	37	42	106	130
Miscellaneous	59	42	(1)	(1)
Total	5,305	7,064	5,494	7,716
Grand total	12,594	19,766	14,419	23,587

[1] Included with "Undistributed" to avoid disclosing individual company confidential data.
[2] Includes glass, grinding and polishing, blast, ferrosilicon, ground, and other sand, and items indicated by footnote 1.
[3] Includes railroad ballast, other uses, and items indicated by footnote 1.

TABLE 8.—Sand and gravel sold or used by producers, by counties

County	1961		1962	
	Short tons	Value	Short tons	Value
Allegheny	205,136	$353,997	210,362	$370,714
Armstrong	1,462,726	3,010,348	1,208,969	2,492,159
Bedford	4,590	12,622	(1)	(1)
Berks	(1)	(1)	85,544	141,789
Bradford	290,002	405,602	(1)	(1)
Butler	136,196	158,037	135,246	166,110
Cambria	8,740	20,717	(1)	(1)
Carbon	(1)	(1)	217,553	314,953
Crawford	107,813	122,527	(1)	(1)
Cumberland	144,846	224,784	222,370	326,490
Fayette	119,940	202,524	162,000	349,000
Jefferson	10,000	4,200	9,000	3,600
Lackawanna	237,546	294,471	186,348	189,851
Lancaster	219,321	394,708	206,016	360,020
Luzerne	348,173	438,494	433,309	522,928
Mercer	401,165	537,918	222,887	293,684
Monroe	61,668	66,158	77,688	84,980
Northampton	523,905	627,011	461,270	550,396
Northumberland	5,215	10,025		
Schuylkill	122,734	271,340	91,482	220,719
Somerset	770	2,310	850	2,680
Venango	309,681	589,126	(1)	(1)
Warren	(1)	(1)	156,091	226,253
Wayne	1,679	2,017	(1)	(1)
Wyoming	448,118	438,374	(1)	(1)
York	256,725	382,111	(1)	(1)
Undistributed [2]	7,167,434	11,196,516	10,331,537	16,970,309
Total	12,594,123	19,765,937	14,418,522	23,586,635

[1] Included with "Undistributed" to avoid disclosing individual company confidential data.
[2] Includes Beaver, Blair, Bucks, Clarion (1962), Columbia, Dauphin, Elk, Erie, Forest, Franklin, Fulton, Huntingdon, Lawrence, Lehigh (1962), Lycoming, McKean, Mifflin, Montgomery, Montour, Philadelphia, and Snyder Counties, unspecified counties (1961), and counties indicated by footnote 1.

Granite production increased 17 percent in tonnage and 12 percent in value over the 1961 output. Dimension granite was produced in Delaware County, and both dimension and crushed granite in Montgomery.

Miscellaneous stone production totaled 865,400 tons valued at $1.4 million, increases of 68 and 66 percent, respectively, from 1961. Crushed stone accounted for 97 percent of the miscellaneous stone production and was produced in Bucks and Montgomery Counties. Dimension stone was produced in Delaware and Montgomery Counties. Sandstone production totaled 2.1 million tons valued at $7.3 million, an increase of 30 and 25 percent, respectively, over 1961 totals. Crushed stone accounted for 96 percent of the sandstone production and was produced in 27 counties led by Westmoreland County with 584,000 tons. Dimension sandstone was produced in 13 counties led by Chester County with 17,300 tons.

Limestone production increased 15 percent in total tonnage value over that of 1961. Crushed limestone production totaled 41.5 million tons valued at $62.4 million. The cement industry consumed 11.2 million tons of crushed limestone and the lime industry 2 million tons. Concrete and roads accounted for 21 million tons of crushed limestone; flux, for 4.6 million tons; and agricultural purposes, for 1.2 million tons. Crushed limestone was produced in 37 counties, led by Northampton County with 5.4 million tons. Other leading counties, each producing over 2 million tons, were Adams, Berks, Centre, Chester, Lancaster, Lawrence, Lehigh, Montgomery, and York Counties. Output of dimension limestone, produced only in Bucks County, decreased.

Dimension slate production totaled 53,460 tons valued at $3.7 million, increases of 14 and 6 percent over that of 1961. Flagging accounted for 24,880 tons; roofing, for 12,070 tons; and structural and sanitary uses, for 10,160 tons. Dimension slate was produced in Northampton and Lehigh Counties. Crushed slate was produced in York, Northampton, and Lycoming Counties and was used chiefly for natural granules and flour. Production of crushed slate decreased in tonnage and value from that of 1961.

Natural roofing granules were produced in Adams and York Counties. Production was slightly below that of 1961. Artificially colored roofing granules were produced in Adams and Beaver Counties. Production increased considerably over 1961 output. Artificially colored granules represented 84 percent of the total roofing granule production.

Sulfur.—Brimstone (sulfur) was recovered as a byproduct in the liquid purification of gas at two refineries in Delaware County and one refinery in Philadelphia County by various processes. Production totaled 30,900 long tons of sulfur equivalent. Shipments totaled 31,100 tons of sulfur equivalent valued at $725,400. This was a 13-percent decrease from that marketed in 1961. Hydrogen sulfide was recovered by the Girdler system using diethanolamine and monethanolamine at a Philadelphia refinery for use in the manufacture of acid. Sulfuric acid (100 percent basis) was recovered at zinc smelters and zinc roasters in Beaver and Carbon Counties.

Talc.—Sericite schist (classed as talc for statistical purposes) was produced at three locations in Adams County. Production increased 20 percent over that of 1961. The crude material was ground and

TABLE 9.—Stone sold or used by producers, by uses

Use	1961		1962	
	Short tons	Value	Short tons	Value
Dimension stone:				
Building stone	143,644	$1,128,525	146,721	$1,232,061
Curbing and flagging	11,372	278,501	11,987	308,245
Other uses	46,891	3,445,385	53,458	3,664,616
Total	201,907	4,852,411	212,166	5,204,922
Crushed and broken stone:				
Concrete and roadstone	21,342,700	31,563,484	26,471,466	39,184,889
Furnace flux (limestone)	4,924,382	8,953,062	4,566,923,	8,448,314
Railroad ballast	641,882	1,003,118	603,870	938,465
Agricultural	1,078,392	2,973,326	1,075,943	3,306,754
Other uses [1]	13,645,002	21,998,505	15,213,556	25,003,504
Total	41,632,358	66,491,495	47,931,758	76,881,926
Grand total	41,834,265	71,343,906	48,143,924	82,086,848

[1] Includes riprap and refractory.

TABLE 10.—Stone sold or used by producers, by counties

County	1961		1962	
	Short tons	Value	Short tons	Value
Adams, Cumberland, York	5,001,344	$10,420,308	6,105,873	$12,622,809
Armstrong	50,111	100,094	(1)	(1)
Berks	2,672,193	3,409,104	3,200,677	4,823,352
Blair, Huntingdon	1,149,020	2,070,070	1,355,747	3,496,433
Bucks	1,513,394	2,756,661	1,671,151	3,050,563
Butler	715,986	1,390,315	1,185,839	2,325,491
Cambria	4,000	14,000	5,000	15,000
Carbon, Monroe, Schuylkill	555,742	1,847,976	897,183	2,207,521
Centre	1,972,355	3,950,176	2,027,577	4,124,154
Chester	2,087,985	3,890,230	2,559,595	4,246,967
Dauphin	1,478,325	2,313,959	1,102,812	1,770,328
Fayette, Somerset	772,894	1,592,048	1,495,280	2,866,745
Franklin	533,193	854,227	782,139	1,212,870
Juniata, Mifflin, Snyder	799,172	1,458,543	724,316	1,256,552
Lancaster	2,586,503	3,733,888	3,121,121	4,687,386
Lawrence	2,665,362	4,407,352	2,519,025	4,030,229
Lebanon	1,294,165	2,283,741	1,358,550	2,362,526
Lehigh, Northampton	6,921,657	9,467,198	7,956,320	10,069,009
Luzerne	149,407	234,993	327,516	533,601
Mercer	17,264	59,702	(1)	(1)
Montgomery	3,959,509	6,757,063	4,172,474	6,812,006
Northumberland	42,334	73,884	48,538	85,916
Potter	(1)	(1)	7,160	205,132
Union	333,675	538,017	(1)	(1)
Wayne	99,948	191,048	(1)	(1)
Westmoreland	(1)	(1)	651,592	1,101,029
Undistributed [2]	4,458,727	7,529,309	4,868,439	8,181,229
Total	41,834,265	71,343,906	48,143,924	82,086,848

[1] Figure withheld to avoid disclosing individual company confidential data.
[2] Includes Allegheny, Bedford, Clarion, Clinton, Delaware, Fulton, Lackawanna, Lycoming, Montour, Perry, Susquehanna, Tioga (1962), Washington, and Wyoming Counties, and counties indicated by footnote 1.

used for asphalt filler, insecticides, roofing, joint cement, and other purposes.

Tripoli.—Production of crude tripoli (rottenstone) was slightly lower. Crude material was produced and ground at two locations in Lycoming County and used as an abrasive in buffing compounds,

metal polish, cleansing and scouring soaps, and similar mixtures, and as a filler.

Vermiculite (Exfoliated).—Crude vermiculite from Montana, South Carolina, and Southern Rhodesia was exfoliated at two plants in Bucks and Lawrence Counties. The product was used for many purposes including home insulation and packing, concrete aggregate, plastering aggregate and packing, and horticultural uses.

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Beryllium.—The Beryllium Corp. of Reading and Hazelton processed beryl to beryllium metal, alloys, and compounds. Most of the output was beryllium metal and beryllium-copper alloys.

Cadmium.—Shipments of primary cadmium metal, recovered from flue dust, collected at the Palmerton smelter of New Jersey Zinc Co. and at the Josephtown plant of St. Joseph Lead Co., increased 22 percent from 1961.

Cobalt.—Concentrates of cobalt were produced by the Bethlehem Cornwall Corp. from magnetite ores processed at its Cornwall operation in Lebanon County and at its Morgantown operation in Berks County. Production was greater than in 1961. The concentrate was processed into metal, oxide, and hydrate by a company in Wilmington, Del.

Copper.—Concentrates of copper were recovered from magnetite processed in Lebanon County. Production was less than in 1961.

Ferroalloys.—Production of ferroalloys increased from 448,678 short tons in 1961 to 513,221 tons. Shipments totaled 455,538 tons valued at $95.4 million. Ferromanganese accounted for 90 percent of the shipments. The remaining shipments consisted of spiegeleisen, ferrotungsten, aluminum-vanadium, ferrovanadium, ferroboron, ferrocolumbium, nickel-columbium, ferromolybdenum, and aluminum-chromium-vanadium.

Gold and Silver.—Gold and silver were recovered from copper concentrates produced by Bethlehem Cornwall Corp. at its Cornwall concentrator in Lebanon County.

Iron Ore.—Magnetite was produced from two underground mines, Grace mine near Morgantown, Berks County, and Cornwall mine near Cornwall, Lebanon County. Concentrators at each mine processed the crude ore by grinding it to a fine powder and magnetically separating ore from waste. A small tonnage of concentrates from the new Cornwall concentrator was shipped to consumers, but the remaining tonnage was processed into pellets in the agglomerating section of the concentrator. All the concentrate production at Morgantown concentrator was processed into pellets in the agglomerating section of the concentrator. Shipments of pellets increased considerably from 1961.

Iron and Steel Scrap.—Consumption of iron and steel scrap totaled 12,682,000 short tons, a 2-percent increase from 1961. Scrap was collected and prepared chiefly in the larger metropolitan areas such as Pittsburgh, Philadelphia, and Harrisburg. The leading varieties of scrap processed and shipped were No. 1 heavy melting steel, No. 2 and all other bundles, cast-iron scrap and other borings, and No. 1 and electric furnace bundles. Consumer stocks of iron and steel scrap in Pennsylvania at yearend totaled 1,894,500 tons.

Pig Iron.—Pig iron was produced by 11 companies at 18 plants and totaled 15.7 million short tons compared with 15.2 million tons in 1961. Basic pig iron was produced at 17 plants, foundry pig iron at 5 plants, bessemer pig iron at 6 plants, low-phosphorus pig iron at 2 plants, malleable pig iron at 5 plants, and direct-casting pig iron at 3 plants.

Basic pig iron accounted for 90 percent of the total pig iron production and malleable pig iron, 3 percent. Blast furnaces in blast during 1962 totaled 51 and consumed the following raw material: 5.1 million tons of domestic iron ore, 2.3 million tons of foreign iron ore, 1.6 million tons of limestone, 1.1 million tons of dolomite, 657,000 tons of mill cinder and roll scale, 1.2 million tons of open-hearth, basic oxygen, and bessemer slag, 10.8 million tons of coke, 895,000 tons of home and purchased scrap, 138,000 tons of slag scrap, and 111,000 tons of other materials. In addition, various quantities of manganiferous ores (foreign and domestic), flue dust, coke breeze, pig iron, and hot metal were consumed in blast furnaces.

Slag (Iron-Blast-Furnace).—Iron-blast-furnace slag processed in Pennsylvania decreased from 6.7 million short tons in 1961 to 6.2 million tons. The value of slag also decreased from $11.4 million in 1961 to $11.1 million. Pennsylvania continued to be the leading producer of iron-blast-furnace slag, with 27 percent of the U.S. tonnage. Of the slag processed in Pennsylvania, 80 percent was screened air-cooled slag used chiefly as an aggregate in highway and airport construction, bituminous construction, portland-cement concrete construction, and for railroad ballast.

Smelters.—Two zinc smelters were active during the year, the Josephtown smelter of St. Joseph Lead Co. and the Palmerton smelter of The New Jersey Zinc Co. The Josephtown zinc smelter processed zinc concentrates from company operations in New York and Missouri and purchased material from other States and foreign countries. The zinc content of metal and oxide production for the Josephtown smelter reached a record high of 153,968 tons, compared with 141,209 tons in 1961. The smelter operated on a 48-hour-week basis during the entire year. The Palmerton smelter processed zinc concentrates shipped from company operations at Friedensville, Pa.; Austinville, Va.; Cannon City, Colo.; Jefferson City, Tenn., and purchased material from various suppliers in other States and foreign countries. The smelter also processed some lead concentrates shipped from Austinville, Va. Construction of the first of two electric furnaces for the production of spiegeleisen and other ferroalloys was completed at Palmerton. The new facility, which replaced the old blast-furnace system, started operations in November. Four additional zinc dust furnaces of improved design were also installed and put in operation at Palmerton.

Zinc.—Zinc ore was produced at the Friedensville mine of The New Jersey Zinc Co. and concentrated at a nearby plant. The concentrate was shipped to the company smelter at Palmerton. The Friedensville mine reported increased production compared with 1961 despite difficult drainage conditions.

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Adams.—Total production of stone increased 35 percent over 1961. Bethlehem Limestone Co. quarried and crushed limestone at an opera-

tion near Hanover. Uses were for flux in iron and steel manufacture, concrete, railroad ballast, agricultural purposes, clay filler, and stone sand. The firm began operating a new processing plant at Hanover that was designed to crush and screen limestone at the rate of 1,200 tons per hour and produce metallurgical material for Bethlehem Steel mills and commercial aggregates. Teeter Stone, Inc., near Gettysburg, and Gettysburg Limestone Products, Inc., near Fairfield, quarried limestone for concrete and roads. The Ruberoid Co., Roofing Granule Division, crushed and ground stone at its Greystone quarry (quartzite) and the Green Spoils dump (basalt) near Charmian for use as roofing granules, tennis court surfacing, asphalt filler, and stone dust. Sericite schist was recovered by Summit Industries, Inc., at two open-pit mines near Mount Hope and Bendersville and trucked to the company plant at Aspers to be ground. The product was used for asphalt filler, insecticides, and joint cement. Mauna Mining Corp. produced pyrophyllite (sericite schist for statistical purposes) at its Pape quarry near Gardners for use as an asphalt filler and for roofing.

Miscellaneous clay was produced from open pits by Gettysburg Drain Tile Works near Gettysburg for making drain tile and by Alwine Brick Co. near New Oxford for making building brick.

Allegheny.—Bituminous coal was produced at 42 operations (21 underground, 20 strip, and 1 auger). Production totaled 4.8 million tons, of which 88 percent was mined underground. Four million tons were not sold in the open market. Twenty-nine continuous-mining machines with 20 mobile loaders produced 2.9 million tons. Thirty-five cutting machines cut 1.35 million tons, and 37 mobile loading machines loaded 1.34 million tons. Strip mines reported 30 power shovels, 6 draglines, 23 bulldozers, 9 power drills, and 28 trucks or tractor-trailers. Seven preparation plants produced 3.6 million tons of clean coal, 58 percent by chance cones. Coal crushed totaled 3.2 million tons, and coal treated totaled 1.6 million tons.

Universal Atlas Cement, Division of United States Steel Corp., manufactured portland and masonry cements at its Universal plant using the dry process. Green Bag Cement Co., Division of Marquette Manufacturing Co., manufactured mostly slag portland cement and some masonry cement by the wet process at its Neville Island plant. Most of the finished cement was shipped to consumers intrastate and to Ohio and West Virginia.

Output of miscellaneous clay declined for the fifth consecutive year and was 68 percent below the 1957 output, when the county was the leading miscellaneous-clay-producing county in the State. Milliken Brick Co., Inc., mined clay from an open pit near Wilkinsburg and continued as the largest of five clay producers in the county. Smaller quantities of miscellaneous clay were recovered near Bridgeville, Creighton, McKeesport, and Murrysville. All of the clay production was used for building brick.

Sand and gravel was recovered by a dredge near Pittsburgh by Harry Zubik Co., Inc., for building and paving purposes. Sand for paving uses was produced by Burrell Construction & Supply Co. near Natrona Heights. Industrial sand and sand for construction purposes was produced by McCrady, Inc., near Harmarville and Sidwell Loam Sand Co. near Pittsburgh.

TABLE 11.—Value of mineral production in Pennsylvania by counties [1] [2]

County	1961	1962	Minerals produced in 1962 in order of value
Adams	(3)	(3)	Stone, sericite schist, clays.
Allegheny	(3)	(3)	Coal, cement, clays, sand and gravel, stone.
Armstrong	(3)	(3)	Coal, sand and gravel, clays, stone, lime.
Beaver	(3)	$3,866,842	Coal, clays, sand and gravel.
Bedford	[4] $1,693,450	2,288,829	Coal, stone, lime, sand and gravel.
Berks	[4] 24,872,370	34,655,423	Iron ore, cement, stone, clays, coal, pyrites, cobalt, sand and gravel.
Blair	[4] 1,877,511	2,160,807	Stone, coal, clays, sand and gravel.
Bradford	(3)	(3)	Sand and gravel.
Bucks	(3)	(3)	Sand and gravel, stone, clays.
Butler	[4] 14,221,736	16,034,719	Coal, cement, stone, lime, sand and gravel, clays.
Cambria	36,582,851	34,419,060	Coal, clays, sand and gravel, stone, iron ore (pigment material).
Cameron	197,349	(3)	Coal.
Carbon	(3)	(3)	Coal, stone, sand and gravel.
Centre	(3)	(3)	Lime, stone, coal, clays.
Chester	(3)	(3)	Stone, lime, clays, gem stones.
Clarion	11,623,425	13,627,949	Coal, stone, clays, sand and gravel.
Clearfield	27,959,810	27,139,085	Coal, clays.
Clinton	1,836,656	1,812,797	Coal, stone, clays.
Columbia	(3)	(3)	Coal, sand and gravel, clays.
Crawford	122,527	(3)	Sand and gravel.
Cumberland	(3)	(3)	Stone, sand and gravel, clays.
Dauphin	[4] 3,798,001	3,329,923	Stone, coal, clays, sand and gravel, lime.
Delaware	(3)	(3)	Stone.
Elk	1,407,929	1,783,675	Coal, clays, sand and gravel.
Erie	(3)	(3)	Sand and gravel, peat.
Fayette	(3)	(3)	Coal, stone, sand and gravel, clays.
Forest	(3)	(3)	Sand and gravel.
Franklin	(3)	(3)	Stone, sand and gravel.
Fulton	(3)	(3)	Do.
Greene	60,582,351	(3)	Coal, clays.
Huntingdon	3,796,577	(3)	Sand and gravel, stone, coal, clays.
Indiana	23,177,337	(3)	Coal, clays.
Jefferson	(3)	(3)	Coal, clays, sand and gravel.
Juniata	(3)	(3)	Stone, lime.
Lackawanna	(3)	(3)	Coal, sand and gravel, stone.
Lancaster	(3)	(3)	Stone, coal, sand and gravel, clays, lime, gem stones
Lawrence	(3)	(3)	Cement, stone, coal, clays, sand and gravel, peat.
Lebanon	(3)	(3)	Iron ore, stone, lime, copper, cobalt, pyrites, coal, gold silver.
Lehigh	(3)	(3)	Cement, zinc, stone, sand and gravel, gem stones.
Luzerne	(3)	(3)	Coal, stone, sand and gravel, peat, clays, gem stones.
Lycoming	1,759,556	1,530,655	Stone, sand and gravel, coal, tripoli.
McKean	371,979	211,590	Clays, sand and gravel.
Mercer	3,958,718	(3)	Coal, sand and gravel, stone.
Mifflin	(3)	1,989,202	Sand and gravel, stone, lime.
Monroe	(3)	1,049,520	Stone, sand and gravel, clays, peat, gem stones.
Montgomery	[4] 12,842,156	13,655,719	Stone, cement, lime, clays, sand and gravel, gem stones.
Montour	(3)	(3)	Stone, sand and gravel
Northampton	(3)	73,728,150	Cement, stone, sand and gravel, gem stones.
Northumberland	(3)	12,941,584	Coal, clays, stone, lime.
Perry	(3)	(3)	Stone.
Philadelphia	(3)	(3)	Sand and gravel.
Potter	(3)	205,132	Stone.
Schuylkill	55,035,930	50,085,171	Coal, stone, sand and gravel, clays.
Snyder	[4] 511,338	430,511	Stone, sand and gravel, coal, clays, lime.
Somerset	(3)	10,657,312	Coal, stone, clays, sand and gravel.
Sullivan	90,334	63,122	Coal.
Susquehanna	(3)	(3)	Stone, coal.
Tioga	1,340,683	(3)	Coal, stone.
Union	538,017	(3)	Stone.
Venango	2,222,660	(3)	Coal, sand and gravel.
Warren	(3)	226,253	Sand and gravel.
Washington	(3)	(3)	Coal, stone.
Wayne	340,653	474,698	Peat, stone, sand and gravel, coal.
Westmoreland	(3)	20,072,149	Coal, stone.
Wyoming	(3)	(3)	Sand and gravel, stone.
York	[4] 15,686,512	16,764,312	Cement, stone, lime, sand and gravel, clays, mica.
Undistributed	[4] 496,679,877	477,947,811	
Total	[4] 805,128,000	823,152,000	

[1] Pike County is not listed because no production was reported.
[2] Excludes value of production for LP gases, natural gasoline, petroleum, natural gas, and some gem stones and sand and gravel (1961) unspecified by counties; included with "Undistributed."
[3] Included with "Undistributed" to avoid disclosing individual company confidential data.
[4] Revised figure.

Malli Mines produced irregular-shaped sandstone for flagging and building stone near Finleyville. Nick Gioia produced rubble sandstone near Buena Vista.

Perlite Manufacturing Co., Carnegie, and Panacalite Perlite Co., Pittsburgh, expanded Colorado perlite, mainly for use in building plaster, loose-fill insulation, and concrete aggregate.

Armstrong.—Bituminous coal was produced at 102 operations (44 underground, 49 strip, and 9 auger). Production totaled 3.5 million tons, 1.9 million tons from underground, 1.5 million tons from strip mines, and 98,000 tons from auger mines. Most of the production, 3.4 million tons, was sold in the open market for an average price of $4.48 per ton. Of the 1.9 million tons produced underground, 73 cutting machines cut 1.7 million tons, 3 continuous mining machines and 1 mobile loader mined 222,000 tons, and 26 mobile loading machines loaded 1.5 million tons. Strip mines had 80 power shovels, 25 draglines, 4 carryall scrapers, 69 bulldozers, 17 power drills, and 143 trucks or tractor-trailers. Auger mines reported 9 augers, 1 bulldozer, 4 power drills, and 17 trucks or tractor-trailers. Eight preparation plants cleaned 1.6 million tons of coal, 63 percent by wet washing other than jigs. Coal crushed totaled 2.1 million tons, and coal treated totaled 91,000 tons.

Sand and gravel was recovered in large quantities by a marine dredge at Kittanning by Davison Sand & Gravel Co. and was used in ready-mixed concrete for building and paving purposes. Sand and gravel was also produced by Glacial Sand & Gravel Co. at Tarrtown, Manorville Sand Co. at Manorville, and John Cihat near Leechburg for construction purposes.

Plastic fire clay was produced at nine operations, six underground and three open pits. Freeport Brick Co. had the largest underground clay mine near Freeport. Other underground clay mines were located near Kittanning (two), New Bethlehem, Templeton, and Adrian. The three open-pit operations were located near Worthington, Craigsville, and Apollo. The plastic fire clay was used for firebrick and block, building brick, pouring pits, and other heavy clay products.

Beaver Run Limestone Co. produced crushed limestone near Apollo for concrete and roadstone. C.D. McCanna and Robert T. Toy produced limestone underground near Kittanning for the manufacture of quicklime in limekilns located at the mines. The quicklime was hydrated for agricultural use.

Beaver.—Bituminous coal was produced at 20 operations (1 underground, 16 strip, and 3 auger). Strip mines produced 587,000 tons and had 23 power shovels, 14 draglines, 20 bulldozers, 5 power drills, and 35 trucks or tractor-trailers. The underground operation reported two hand-loaded face conveyors and two cutting machines. Auger mines produced 42,000 tons and reported three augers, one power drill, and three trucks or tractor-trailers. No preparation plants were in operation, but 128,650 tons was crushed at loading tipples.

Plastic fire clay, produced at five operations, three underground mines near Beaver Falls, Fallston, and New Brighton and two open pits near Darlington, was used chiefly for building brick. Semiflint clay was produced near Darlington for building brick, and miscellaneous red clay was produced near New Brighton for pottery and flower pots.

Sand and gravel was recovered by Shippingport Sand & Gravel Co. near Shippingport and Iron City Sand & Gravel Corp. near Pittsburgh for building and paving purposes. Ellwood Stone Co. processed industrial sand for grinding and polishing, blast, fire, and engine uses near Ellwood City.

Central Commercial Co. produced artificially colored roofing granules at a plant near Darlington.

Bedford.—Bituminous coal was produced at 16 operations (14 underground and 2 strip). Underground mines produced 177,600 tons by 1 continuous miner, 6 hand-loaded face conveyors, and 2 cutting machines, with 87,960 tons of the total underground production shot from the solid and cut by hand. Strip mines reported 4 power shovels, 3 draglines, 4 bulldozers, 2 power drills, and 4 trucks or tractor-trailers. No preparation plants were reported in operation but some coal was crushed at loading tipples.

New Enterprise Stone & Lime Co. produced crushed limestone at its Ashcom quarry for concrete, roadstone, agricultural purposes, mine dust, and lime manufacture. Quicklime and hydrated lime were also manufactured at the Ashcom operation. Bedford County Stone & Lime Co. produced limestone near New Paris for concrete and roadstone. Sand was produced by Feight Brothers near Everett for building purposes.

Berks.—Bethlehem Cornwall Corp. continued to produce crude magnetite from its Grace underground mine near Morgantown by block caving and shrinkage stoping. The crude ore was processed in the company concentrator located at the mine by flotation and magnetic separation.

Allentown Portland Cement Co. quarried and crushed cement rock and limestone at two operations near Evansville and manufactured portland and masonry cement at its Evansville No. 1 plant. Finished cement was shipped mostly to ready-mixed concrete companies. Shipments and value of portland cement showed an increase over those of 1961. Eastern Lime Corp. quarried and crushed limestone at its Hinterleiters quarry, Kutztown, and Oley quarry, Oley, for concrete, roadstone, agricultural purposes, and cement manufacture. E. J. Breneman, Inc., produced crushed limestone near Sinking Spring and sold various sized stone to contractors for State and local government projects and to State and local governments. Berks Products Corp. produced crushed limestone near Temple for concrete and roadstone. Basalt, crushed chiefly for use as railroad ballast and road material was recovered from the Clingan quarry near Birdsboro by The John T. Dyer Quarry Co. Pottstown Trap Rock Quarries, Inc., Pottstown, and Bradford Hills Quarry, Inc., Morgantown, quarried diabase for use as concrete aggregate and roadstone. Reading Poultry Food Co., Reading, crushed oystershell for poultry grit and mineral food.

Production and value of anthracite decreased, compared with those of 1961.

Sand and gravel was produced by Schildt Bros. near Temple and by Grings Quarry near Sinking Spring for construction purposes. Industrial sand for fire or furnace use was produced near Pricetown by Refractory Sand Co., Inc.

Miscellaneous clay and shale was produced from two open pits near Wyomissing and Shoemakersville by Glen Gery Shale Brick Corp.

and used to manufacture building brick. Mineral specimens were collected near Lobachsville and Boyertown.

Blair.—Crushed limestone was produced at quarries near Hollidaysburg (three), Altoona, Claysburg, Royer, Duncansville, Roaring Springs, and Tyrone for concrete, roadstone, and agricultural purposes. General Refractories Co., Frankstown, and J. L. Hartman, Sproul, quarried and crushed quartzite for silica brick.

West Virginia Pulp & Paper Co. produced regenerated quicklime in secondary recovery operations for use in the manufacture of paper at its Tyrone and Williamsburg plants.

Bituminous coal was produced at four operations (three underground and one strip). Production totaled 78,400 tons of which 91 percent came from the strip mine. Underground mines had three hand-loaded face conveyors with all the coal shot from the solid and cut by hand. The strip mine reported 2 power shovels, 1 dragline, 2 bulldozers, and 10 trucks or tractor-trailers. No preparation plants were reported in operation, but a small tonnage was treated with coal spray.

Kaolin was produced from an open-pit mine by Grannas Brothers near Williamsburg and used to manufacture firebrick and block. Plastic fire clay was produced from the Butler open-pit mine of Harbison-Walker Refractories Co. near Hollidaysburg. Sand was produced by Frankstown Sand Co. at Frankstown and by Frankstown Sand Supply near Hollidaysburg for building purposes.

Bradford.—Sand and gravel was produced by Towanda Sand & Gravel Co., Inc., and J. A. Eck & Sons, Inc., near Towanda for building and paving purposes. Bituminous coal was produced at one strip operation reporting two power shovels, one dragline, and two trucks.

Bucks.—Sand and gravel was produced in large quantities at the Van Sciver plant of Warner Co. near Tullytown for building uses and ready-mixed concrete. Sand and gravel, primarily for building purposes, was produced by the following companies: Durnan & Good, Kintnersville; A. L. Lewis, New Hope; Amico Sand & Gravel Co., Morrisville; Frank Casillo & Sons, Inc., Upper Black Eddy; Silvi Concrete Products, Tullytown; and Penn Valley Crushed Stone Co., Levittown. Industrial sand for molding was produced near Tullytown by The Brennan Sand Co.

Crushed limestone for concrete and roadstone was produced by five companies operating quarries near New Hope, Buckingham, Trevose, Rushland, and Eureka. Some dimension building limestone was quarried near Trevose. Largest limestone producers were Eureka Stone Quarry, Inc., and New Hope Crushed Stone Lime Co. Samuel M. Yoder Estate operated the Blooming Glen quarry and crushing plant, producing bluestone and redstone; George Wiley operated Wiley's quarry near Point Pleasant, producing bluestone. Both companies quarried and crushed sandstone for concrete and roadstone. Some dimension sandstone was quarried near Lumberville and sold as irregularly-shaped construction stone. Five operators near Telford, Ottsville, Quakertown, Edison, and Weisel quarried and crushed diabase for concrete and roadstone. A quantity of dimension diabase for rough and dressed construction and dressed monumental stone was also produced. Crushed and broken miscellaneous stone (argil-

lite), sold or used as concrete aggregate and roadstone, was produced by Better Materials Corp., Penns Park.

Hyzer & Lewellen, Southampton, exfoliated crude vermiculite from Southern Rhodesia. The material was screened and sold as residential insulation and concrete and plaster aggregate. Miscellaneous clay was obtained from an open pit near Quakertown by Quakertown Brick & Tile Co., Inc., for the manufacture of building brick.

Butler.—Bituminous coal was produced at 64 operations (22 underground, 34 strip, and 8 auger). Production totaled 2.2 million tons, of which 83 percent came from strip mines. Underground operations had 29 cutting machines, 4 mobile loaders, 1 continuous miner, 2 self-loading conveyors, and 6 hand-loaded face conveyors. Strip mines reported 44 power shovels, 23 draglines, 48 bulldozers, 22 power drills, 128 trucks or tractor-trailers. Auger mines reported 8 augers, 1 bulldozer, 1 power drill, and 15 trucks or tractor-trailers. Two preparation plants were active, one using a jig and one using heavy media cleaning equipment. Coal crushed totaled 879,700 tons, and coal treated totaled 128,700 tons.

Penn-Dixie Cement Corp. produced crushed limestone and manufactured portland and masonry cement, using the wet process at its No. 9 plant near West Winfield. Finished cement was shipped mostly by truck, in bulk, to ready-mixed concrete companies.

Production of limestone, the only stone produced, increased 66 percent. Sechan Limestone Co., Prospect, and Allegheny Mineral Corp., Harrisville, produced crushed limestone for concrete and roadstone. Grove City Limestone Co., Branchton, and Winfield Lime & Stone Co., West Winfield, produced crushed limestone for concrete, roadstone, and agricultural purposes.

Quicklime and hydrated lime were produced by Mercer Lime & Stone Co. at its plant near Branchton and were sold for chemical and industrial uses. Some hydrated lime was sold for agricultural purposes. Sand and gravel for construction purposes was produced by H. W. Cooper, Slippery Rock, Penn-Dixie Cement Corp., Nazareth, and Highway Sand & Gravel Co., Inc., Slippery Rock. Scott Borland Brick Yard obtained miscellaneous clay and shale from a deposit near Mars for manufacturing building brick.

Cambria.—Bituminous coal was produced at 113 operations (91 underground, 19 strip, and 3 auger). Production from underground mines totaled 5.45 million tons, of which 4.26 million tons was mined by 85 continuous-mining machines. Additional underground mining equipment included 19 mobile loading machines, 40 hand-loaded face conveyors, 108 cutting machines, 205 shuttle cars, and 136 belt conveyors. Strip mines reported 42 power shovels, 16 draglines, 28 bulldozers, 9 power drills, and 47 trucks or tractor-trailers. Auger mines reported three augers and two trucks. Eleven preparation plants cleaned 4.6 million tons of underground coal by pneumatic methods and wet washing, other than jigs. Coal crushed totaled 2.6 million tons, and coal treated totaled 406,000 tons.

Harbison-Walker Refractories Co. abandoned the Frick underground fire-clay mine near Blandburg and used clay from stockpiles. Flint fire clay was mined underground near South Fork for sleeves, nozzles, and stoppers by Hiram Swank's Sons, Inc. Triangle Clay Products Co. produced miscellaneous clay for building brick and

installed new crushing facilities at its operation near Johnstown. Plastic fire clay was produced by George P. Gates from an underground mine near Patton for vitrified sewer pipe.

Sand and gravel was produced near Johnstown by Parry Sand & Gravel Co. for building and fill purposes.

Samuel Nicosia, Johnstown, produced and sold crushed sandstone for roadstone and making silica brick. Lanzendorfer Minerals Co. produced sulfur mud for iron oxide pigments at its No. 31 mine near Nanty Glo.

Cameron.—Bituminous coal was produced at one strip operation reporting four power shovels, one dragline, three bulldozers, one power drill, and seven trucks or tractor-trailers. The coal was cleaned at a preparation plant using heavy media cleaning equipment.

Carbon.—Anthracite from underground mines, strip pits, and culm banks totaled 674,000 tons, 22 percent more than in 1961. Fifty-six percent of the production was shipped by truck. Leading producers of anthracite were Greenwood Stripping Corp. and Sullivan Trail Coal Co.

Quartzite was produced at the Little Gap quarry and crushed for making silica brick at the Palmerton plant of North American Refractories. Crushed and broken sandstone used mainly for road material was quarried at the Red Rock quarry near Nesquehoning by James and Paul Fauzio.

Sand was produced near Palmerton by Alliance Sand Co. of Martin Marietta Corp. for building, paving, and cement manufacture. Sand and gravel was produced for building uses by Wagner Sand Co. near Hazelton.

Centre.—The county remained the leading lime-producing area. Three companies operated rotary kilns near Bellefonte. Quicklime and hydrated lime were marketed chiefly for chemical uses, but smaller quantities were sold for construction and agricultural purposes.

Six companies produced crushed limestone at operations near Bellefonte (three), State College (one), and Pleasant Gap (two). The crushed limestone was used primarily for lime manufacture, concrete, roadstone, glassmaking, flux, stone sand, and agricultural purposes.

Bituminous coal was produced at 28 operations (12 underground and 16 strip). Production totaled 729,000 tons, of which 96 percent came from strip mines reporting 40 power shovels, 19 draglines, 22 bulldozers, 14 power drills, and 85 trucks or tractor-trailers. Underground operations used five cutting machines and three hand-loaded face conveyors. One preparation plant cleaned 210,000 tons by wet washing using jigs and 56,500 tons by pneumatic methods. Coal crushed totaled 391,000 tons and coal treated totaled 50,000 tons.

Plastic fire clay was produced by Harbison-Walker Refractories Co. at its Blair open-pit mine.

Chester.—Bradford Hills Quarry, Inc., crushed a large amount of limestone at an operation near Downingtown for concrete and roadstone. The Warner Co. produced crushed limestone and dolomite near Devault primarily for its Cedar Hollow lime and magnesite plants, although sizable quantities of stone were used for flux, refractory, and agricultural purposes. Quicklime and hydrated lime were manufactured at the Cedar Hollow plant for construction, agricultural, and chemical uses. The Warner Co. also produced crushed limestone for

concrete and roadstone at its Johnson plant near Paoli. Valley Forge Stone Co. produced crushed limestone for concrete, roadstone, and riprap at an operation near Malvern.

Abram T. Minor, John Fecondo & Sons, and Albert Rotunno, all near Avondale, quarried dimension sandstone (bluestone) as irregularly-shaped construction stone, flagging, and rubble. Frank Rarick (formerly Bacton Hill Quarry) quarried dimension sandstone for use as irregularly-shaped construction stone and rubble near Malvern. Dimension stone (black diabase) dressed for use as architectural stone, monuments and mausoleums, and industrial surface plates, was quarried near Saint Peters. Crushed and broken diabase was quarried near Glenmoore and Devault for roadstone and railroad ballast.

McAvoy Vitrified Brick Co. produced miscellaneous clay and shale near Phoenixville for manufacturing building brick. Mineral specimens were collected near West Chester, Cornog, Coatesville, and Chester Springs.

Clarion.—Bituminous coal was produced at 48 operations (6 underground, 35 strip, and 7 auger). Production totaled 3.5 million tons, of which 98 percent came from strip mines reporting 82 power shovels, 48 draglines, 56 bulldozers, 12 power drills, and 153 trucks or tractor-trailers. Underground operations reported six cutting machines, one mobile loader, one continuous miner, and three handloaded face conveyors. Auger mines reported seven augers, one bulldozer, and six trucks or tractor-trailers. Seven preparation plants cleaned 1.7 million tons of strip coal, of which 731,600 tons was cleaned by wet washing using jigs, 753,400 tons by wet washing using heavy media, and 212,500 tons by pneumatic methods. Coal crushed totaled 2.5 million tons, and coal treated totaled 285,500 tons.

Limestone was quarried and crushed by Allegheny Mineral Corp. near Parker for road material and agricultural purposes and by Emlenton Limestone Co., Inc., near Turkey City for road material.

Plastic and flint fire clay was produced underground by A. P. Green Fire Brick Co. at its Climax operation for firebrick and block. Plastic fire clay was produced near New Bethlehem by Frank Pope Co. for mortar. Flint fire clay was produced for clay crucibles near Corsica by W. P. Stahlman Coal Co., Inc. Flint fire clay was mined underground at Lucinda for firebrick and block. New Bethlehem Tile Co. produced plastic fire clay and miscellaneous shale for building brick and structural clay tile near New Bethlehem. Glacial Sand & Gravel Co. processed sand and gravel for building, paving, and tile underdrain at its Parker plant.

Clearfield.—Bituminous coal was produced at 187 operations (73 underground, 104 strip, and 10 auger). Production totaled 6.6 million tons, of which 83 percent came from strip mines reporting 211 power shovels, 100 draglines, 2 carryall scrapers, 152 bulldozers, 66 power drills, and 376 trucks or tractor-trailers. Underground operations produced 1 million tons of coal using 103 cutting machines, 15 mobile loaders, 3 continuous miners, 11 self-loading conveyors, and 34 handloaded face conveyors. Auger mines reported 12 augers, 3 bulldozers, and 16 trucks or tractor-trailers. Seven preparation plants cleaned 1.3 million tons, 63 percent by pneumatic methods and the remainder by heavy media processes. Of the coal cleaned, 64 percent came from

strip mines and 36 percent from underground mines. Coal crushed totaled 2.7 million tons, and coal treated totaled 546,000 tons.

General Refractories Co. produced flint fire clay at 5 locations near West Decatur for firebrick and block. Harbison-Walker Refractories Co. reported plastic fire clay production for refractory products from 10 operations near Clearfield. Flint fire clay production only was reported at six operations for firebrick and block. Plastic fire clay production only was reported at nine operations for refractories or heavy clay products. Thomas Bros. Coal Co. near Curwensville was the leading producer of plastic fire clay. American Vitrified Products Co. manufactured vitrified sewer pipe from miscellaneous clay and shale produced near Clearfield.

Clinton.—Bituminous coal was produced at seven operations, one underground and six strip. Production totaled 406,700 tons, of which 404,700 tons came from strip mines reporting 13 power shovels, 4 draglines, 1 carryall scraper, 11 bulldozers, 2 power drills, and 12 trucks or tractor-trailers. The underground operation cut coal by hand and shot from the solid. One preparation plant cleaned 64,000 tons of strip coal using a heavy media washer. Coal crushed totaled 168,300 tons, and coal treated totaled 41,900 tons.

Crushed and sized limestone for concrete, roadstone, and railroad ballast was produced by Lycoming Silica Sand Co. near Salona. Miscellaneous clay and shale was mined under contract for Mill Hall Clay Products, Inc. and used in manufacturing heavy clay products. Flint diaspore and shaly iron type fire clay was produced from a deposit by Fink & Stackhouse near Lock Haven and sold for the manufacture of refractories.

Columbia.—Anthracite production totaled 388,000 tons, 19 percent below the 1961 output. Jeddo-Highland Coal Co. was the major producer. Bloomsburg Sand & Gravel Co. produced building sand and gravel at a pit and processing plant near Bloomsburg. Miscellaneous clay and shale was recovered from an open pit near Mifflinville by The Alliance Clay Product Co., on property leased from Lloyd E. Eister, and used for manufacturing building brick.

Crawford.—Sand and gravel was produced by Conneaut Lake Sand & Gravel for building, paving, and fill uses near Conneaut Lake; W. L. Dunn for paving purposes near Cochranton; and Hasbrouck Sand & Gravel for building and paving uses near Titusville.

Cumberland.—Crushed limestone for roads was produced by Hempt Bros., Inc., Eberly Mills, and Valley Quarries, Inc., Shippensburg. Locust Point Quarries, Mechanicsburg, quarried and crushed limestone for concrete, roadstone, and agricultural purposes. Sand and gravel production for building and paving was recorded at two operations, R. A. Bender & Son near Mt. Holly Springs and Hempt Bros. near Camp Hill. Sand for building purposes was produced by C. and L. Goodhart at Walnut Bottom. Cumberland County remained the leading kaolin-producing county. Kaolin was mined from the Toland open-pit mine near Mt. Holly Springs by Philadelphia Clay Co. and used almost entirely in making white cement. A small tonnage of kaolin was used in making colonial building bricks.

Dauphin.—Crushed limestone was produced at quarries near Steelton, Hummelstown, and Palmyra and was primarily used as blast-furnace and open-hearth flux, aggregate, and roadstone. Faylor Lime & Stone

Co., Elizabethville, produced crushed basalt (traprock) for road material. Production of anthracite totaled 143,000 tons; 61 percent was shipped by truck and the rest by rail. Leading producers included Gangloff Bros. and Elizabethville Coal Co.

Glen Gery Shale Brick Corp. used large amounts of miscellaneous clay and shale from its open pits near Harrisburg and Middletown for manufacturing building brick. Bethlehem Limestone Co. mined some miscellaneous clay and shale near Steelton for refractories and other uses. Sand and gravel was processed for building purposes by Pennsy Supply, Inc., at its Amity Hall plant near Duncannon. H. E. Millard Lime & Stone Co. manufactured hydrated lime for agricultural use at its Swatara plant near Annville.

Delaware.—Dimension sandstone for rough construction and rubble was quarried near Media by Media Quarry Co. Crushed granite (gneiss) for concrete and roadstone was quarried near Havertown and Glen Mills. Dimension granite was recovered at quarries near Lima and Swarthmore, for use as irregularly-shaped construction stone. Quarries in the central part of the county near Media, Springfield, and Marple Township, produced dimension miscellaneous stone (mica-schist) for rough and dressed structural stone and rubble.

Crude Colorado perlite was expanded at the Primos plant of Perlite Products Co. The expanded material was sold or used mainly as building plaster aggregate.

Sun Oil Co. recovered sulfur at its Marcus Hook refinery as a byproduct from the single-stage catalytic oxidation of hydrogen sulfide. Using the Claus-type process, Sinclair Refining Co. produced liquid sulfur as a byproduct in the liquid purification of oil refinery gas at its Marcus Hook refinery.

Elk.—Bituminous coal was produced at 25 operations (16 underground, 8 strip, and 1 auger). Production totaled 457,300 tons, of which 67 percent came from strip mines reporting 17 power shovels, 5 draglines, 1 carryall scraper, 7 bulldozers, 2 power drills, and 20 trucks or tractor-trailers. Underground operations used 31 cutting machines, 1 mobile loader, and 15 hand-loaded face conveyors. The auger mine reported 2 augers in its operation. One preparation plant cleaned coal for an underground mine. Coal crushed at loading tipples totaled 107,400 tons.

Plastic fire clay was produced at a strip mine near Weedville by E. M. Brown, Inc., and sold for manufacturing firebrick and block. Gravel was produced by Stone Haven Mix from a portable plant near Johnsonburg for use on roads by State and local highway crews.

Erie.—Erie Sand Steamship Co. near Erie produced over 1.1 million tons of sand by portable dredge and processed it for building and other uses. Sand and gravel for construction purposes was produced by A. Duchini Co., Erie, Nickel Plate Sand & Gravel Co., Fairview, and North Girard Concrete Works, Lake City. Industrial sand for molding was produced by Peerless Mineral Products Co. near Springfield.

Corry Peat Products Co. recovered reed-sedge and humus type peat from a bog near Corry. The output was sold in packages and in bulk.

Fayette.—Bituminous coal was produced at 56 operations (32 underground and 24 strip). Production totaled 1.3 million tons, of which

68 percent came from underground mines using 9 continuous miners, 6 mobile loaders, and 13 cutting machines with 68,800 tons being cut by hand and shot from the solid. Strip mining used 30 power shovels, 8 draglines, 23 bulldozers, 9 power drills, and 35 trucks or tractor-trailers. Five preparation plants cleaned 3.87 million tons of coal, using jigs, heavy media, and pneumatic cleaning equipment. Coal crushed totaled 871,800 tons.

Fry Coal & Stone Co., Division of Martin Marietta Corp., ground and sized limestone at the Lake Lynn quarry, Lake Lynn, and the Coolspring quarry, Uniontown. The stone was used for concrete, roadstone, rock dust, and agricultural purposes. General Refractories Co. crushed and ground ganister rock at its No. 2 Childs quarry for making silica brick. Connellsville Bluestone Co., Scottdale, quarried and crushed sandstone (bluestone) for road material. Some dimension sandstone was quarried for rubble near Connellsville by Andrew F. Kruczkiewicz. McClain Sand Co., Inc. produced 162,000 tons of sand and gravel for building and paving purposes near Point Marion.

Plastic and flint fire clay was produced at a strip pit near Ohiopyle by Kaiser Refractories & Chemicals Division of Kaiser Aluminum & Chemical Corp. for manufacturing firebrick and block. Robert N. Matthews produced and sold plastic and flint fire clay from Gettemy strip mine near Uniontown. Miscellaneous clay for manufacturing building brick was produced by Layton Fire Clay Co. at an open-pit operation near Layton. Harbison-Walker Refractories Co. produced some plastic fire clay near Ohiopyle at its Smith open-pit mine.

Forest.—Tionesta Sand & Gravel, Inc., prepared sand and gravel for construction at its stationary plant near Tionesta.

Franklin.—Production of stone totaled 782,000 tons, a 47-percent increase over that of 1961. Crushed limestone was used for concrete, roadstone, agricultural purposes, and railroad ballast. Limestone quarries were active near Dry Run, Williamson, Zullinger, Chambersburg, and Shippensburg. Pinola Lime & Stone Corp., Shippensburg, installed additional crushing equipment and storage bins to produce approximately 1,500 tons of limestone per day.

Caledonia Sand Co. and Mt. Cydonia Sand Co., Inc., mined sand from deposits near Fayetteville and processed it for building.

Fulton.—Crushed limestone was produced by H. B. Mellot Estate, Inc., at its Morton quarry, Big Cove Tannery, and Charlton quarry, Warfordsburg, for use as concrete aggrageate and roadstone. Mellot Sand processed sand near Warfordsburg for building and highway construction by contractors and other users.

Greene.—Bituminous coal was produced at 29 operations (22 underground and 7 strip). Production totaled 9.1 million tons, of which only 41,000 tons came from strip mines. Underground operations used 85 continuous miners with 21 mobile loaders to load 8.7 million tons of coal, 42 cutting machines to cut 371,600 tons and 29 mobile loaders to load 364,900 tons. Strip mines reported 9 power shovels, 1 dragline, 9 bulldozers, 3 vertical power drills, and 3 trucks or tractor-trailers. Six preparation plants cleaned 6.4 million tons of coal, 1 million tons by jigs and 5.4 million tons by heavy media, launders, hydroseparators, and duster tables. Coal crushed totaled 4.34 million tons.

Greene County Clay Products Co., Inc., used a small quantity of miscellaneous clay obtained from a nearby bank for the manufacture of building brick near Waynesburg.

Huntingdon.—Industrial sand, ground and unground, was produced by Pennsylvania Glass Sand Corp. at its Keystone works near Mapleton Depot. Most of the unground sand was used in manufacturing glass, and smaller tonnages were used for molding, blast, and engine purposes. Most of the ground sand was used in pottery, porcelain, and tile and for foundry uses; smaller tonnages were used for abrasives, chemical, enamel, filler, glass, binding products, and other purposes.

New Enterprise Stone & Lime Co. crushed limestone at its McConnellstown quarry for concrete aggregate and roadstone. The Warner Co., Union Furnace, quarried and crushed limestone for roadstone, riprap, and railroad ballast. Harbison-Walker Refractories Co., Mount Union, and North American Refractories Co., Three Springs, quarried and crushed ganister rock for making silica brick at local plants.

Bituminous coal was produced at seven operations (four underground and three strip). One cutting machine was used in underground operations. Strip mines reported four power shovels, two draglines, four bulldozers, two power drills, and five trucks or tractor-trailers. No preparation or crushing equipment was reported.

Plastic fire clay was produced and sold for making refractory mortar by Alexandria Fire Clay Co. near Alexandria.

Indiana.—Bituminous coal was produced at 95 operations (63 underground, 30 strip, and 2 auger). Production totaled 4.8 million tons, of which 87 percent came from underground operations. Of the total underground production, 2.9 million tons was produced by 36 continuous miners with 6 mobile loaders, 1.1 million tons was loaded by 29 mobile loaders, 1.3 million tons was cut by 73 cutting machines, 78,000 tons was hand-loaded onto 23 face conveyors, and 32,000 tons was loaded by 3 self-loading conveyors. Strip operations had 48 power shovels, 17 draglines, 1 carryall scraper, 51 bulldozers, 10 power drills, and 104 trucks or tractor-trailers. Ten preparation plants cleaned 3.9 million tons of coal, 3.2 million tons by heavy media, chance cones, diester tables, hydrotator, and froth flotation equipment, and the remaining tonnage by jigs and pneumatic equipment. Coal crushed totaled 1.5 million tons, and coal treated totaled 230,000 tons.

Plastic fire clay produced at the L. H. Foehrenbach strip mine near Clymer was sold and used to manufacture refractories.

Jefferson.—Bituminous coal was produced at 56 operations (24 underground, 27 strip, and 5 auger). Production totaled 1.38 million tons, of which 69 percent came from strip mines that had 56 power shovels, 17 draglines, 45 bulldozers, 4 power drills, and 69 trucks or tractor-trailers. Underground mines reported 39 cutting machines, 2 continuous miners, 5 self-loading conveyors, and 20 hand-loaded face conveyors. Auger mines reported six augers, one bulldozer, and three trucks. One preparation plant cleaned 208,900 tons of strip coal by jigs and pneumatic equipment. Coal crushed totaled 803,300 tons, and coal treated totaled 40,800 tons.

Plastic fire clay was produced by The Brockway Clay Co. at its underground and open-pit mines near Brockway for the manufacture of vitrified sewer pipe. Plastic fire clay was also produced from an underground mine at Summerville by Hanley Co. for the manufacture of building brick and other heavy clay products. Henry O'Neill & Co. produced and sold flint fire clay from an underground operation near Brookville.

Gravel was recovered near Brockway by Brockway Sand & Gravel and sold unprocessed for use as paving material.

Juniata.—Limestone was quarried near Mifflintown by Juniata Limestone Co., for concrete, agricultural purposes, cement manufacture, and roadstone. Fulkroad Lime Quarry, McAlisterville, produced limestone to manufacture quicklime for agricultural purposes. Kaiser Aluminum & Chemical Corp. produced crushed quartzite for making silica brick at its Van Dyke plant near Thompsontown but operations were discontinued in May.

Lackawanna.—Total production and value of anthracite declined slightly. Carbondale Coal Co. and Moffat Coal Co., Inc., were leading anthracite producers.

Sand and gravel for ready-mixed concrete and building and paving purposes was produced by Contractors Sand & Gravel, Inc., near Moscow. Scranton Sand & Stone Co., Gouldsboro, and The East Lemon Sand & Gravel Co., Dunmore, produced sand and gravel for paving purposes.

Crushed sandstone was produced at the West Mountain quarry near Scranton by Stabler Construction Co. Most of the production was sold to the Pennsylvania Department of Highways for road construction.

Lancaster.—Crushed limestone production totaled 3,121,000 tons from quarries located near Ephrata, East Petersburg, Blue Ball, Denver, Rheems, Talmage, Lititz, Landisville, Gap, Bainbridge, Paradise, Silver Springs, and Quarryville. The leading producer was D. M. Stoltzfus & Son, Inc., with quarries at Talmage and Quarryville. Most of the crushed limestone was used for concrete and roadstone, and smaller quantities were used for lime manufacture, agricultural purposes, asphalt filler, stone sand, refractory material, mineral food, and poultry grit.

Anthracite was produced by dredging operations in the Susquehanna River and production increased slightly from 1961.

Ephrata Sand & Gravel Co., Brownstown, produced sand for concrete and black top and gravel for road base. Hempt Bros., Elizabethtown, and Milton Grove Sand, Inc., Milton Grove, continued to process sand for construction purposes. Industrial sand was processed near Honeybrook by George F. Pettinos, Inc., for furnace use.

Miscellaneous clay and shale was produced at openpit operations of Glen Gery Shale Brick Corp. near Ephrata and Lancaster Brick Co. near Lancaster for the manufacture of building brick. Plastic fire clay was produced near Narvon by Narvon Mines, Ltd., and sold for use in foundries, rubber, insecticides, and fungicides and for building brick. Amos K. Stoltzfus manufactured quicklime for agricultural purposes near Elverson. Fluorite specimens were collected near Blue Ball.

Lawrence.—Portland and masonry cements were manufactured at the Bessemer plant of Bessemer Cement Co., Division of Diamond Alkali Co., using the wet process. Medusa Portland Cement Co. produced portland and masonry cements at its Wampum plant, using the dry process. Bulk shipments by truck to ready-mix concrete companies and highway contractors in Pennsylvania and Ohio comprised a major portion of the sales. Limestone production totaled 2.5 million tons. Medusa Portland Cement Co. produced limestone near Wampum, solely for cement manufacture. Michigan Limestone, Division of United States Steel Corp., produced limestone near Hillsville for blast-furnace flux and cement manufacture. Bessemer Cement Co., Division of Diamond Alkali Co., produced limestone near Bessemer for cement manufacture, blast-furnace flux, and roadstone. Calcite Quarry Corp., produced limestone near Lebanon for concrete, roadstone, cement manufacture, metallurgical flux, agricultural purposes, railroad ballast, and lime manufacture. New Castle Lime & Stone Co. produced limestone near Lowellville for concrete, roadstone, paint filler, asphalt and roofing paper filler, dust for coal mines, and agricultural purposes. Mooney Bros. produced limestone near West Pittsburg for concrete and roadstone.

Bituminous coal was produced at 25 operations (1 underground, 21 strip, and 3 auger). Strip mines produced 603,600 tons operating 32 power shovels, 21 draglines, 20 bulldozers, 4 power drills, and 25 trucks or tractor-trailers. All the coal at the underground operation was cut by one machine and hand-loaded onto a face conveyor. Coal crushed totaled 9,800 tons. None of the coal production was mechanically cleaned.

Lawrence County ranked first in total clay production. Plastic fire clay produced by Ralph A. Veon, Inc., was used to manufacture refractories and heavy clay products. Plastic fire clay was also produced near Enon Valley by Natco Corp. and The Negley Fire Clay Co. Metropolitan Brick, Inc., produced both plastic fire clay and miscellaneous clay for making building brick on properties leased near Bessemer. The Bessemer Cement Co., Division of Diamond Alkali Co., produced miscellaneous clay and shale for manufacturing portland and other hydraulic cements near Bessemer. Keystone Loam & Clay Co. sold miscellaneous clay near Edinburg for use in foundries and steelworks. Fenati Brick Co., Inc. produced miscellaneous clay and shale from an open pit near New Castle for use in its building brick plant.

Superior Sand & Supply Co. and Mooney Bros. Supply Co. processed sand and gravel for building, paving, and fill purposes. Mahoning Valley Sand Co. processed sand and gravel for construction purposes and a small quantity of industrial sand for foundry purposes near West Pittsburgh.

D. M. Boyd produced reed-sedge and humus peat from bogs near New Wilmington. Moore's Humus & Nursery recovered humus peat from bogs near Washington Township. Both companies sold their output in bulk.

Crude vermiculite shipped from Montana and South Carolina, was exfoliated by Zonolite Co. at its Elwood City plant.

Lebanon.—Bethlehem Cornwall Corp. produced crude magnetite from underground operations at Cornwall by the block-caving method.

The crude ore was processed in the new Cornwall concentrator by crushing and grinding, magnetic separation, flotation, and agglomeration, yielding iron ore pellets, iron ore concentrates, copper concentrates containing silver and gold, and pyrite concentrates containing cobalt.

Limestone production totaled 1,359,000 tons, an increase of 5 percent over that of 1961. H. E. Millard Lime & Stone Co. produced over half of the total limestone production near Annville for cement manufacture, concrete, roadstone, railroad ballast, agricultural purposes, and its own lime manufacture. The company operated 4 rotary kilns to produce quicklime and hydrated lime at its Annville plant. The lime was used chiefly for metallurgy, construction, water purification, papermaking, and agricultural purposes. Fiala, Inc., produced limestone near Annville for cement manufacture and metallurgical flux. Limestone for concrete and roadstone was produced by Pennsylvania Aggregates, Inc., near Cornwall.

Anthracite production increased from that of 1961.

Lehigh.—Production of limestone totaled 2,477,000 tons, an increase of 15 percent over 1961 output. Coplay Cement Manufacturing Co., Coplay, The Whitehall Cement Manufacturing Co., Cementon, Lehigh Portland Cement Co., Fogelsville, and Giant Portland Cement Co., Egypt, quarried and crushed limestone for manufacturing portland and masonry cements at local plants. Major shipments of cement were by railroad, mostly in bulk, to ready-mixed concrete companies in Pennsylvania, New Jersey, and New York. Lehigh Stone Co., Ormrod, Roy J. Kern, Schnecksville, and Eastern Lime Corp., West Coplay, quarried and crushed limestone for concrete and roadstone. Penn Big Bed Slate Co., Inc., processed slate at its No. 2 quarry near Slatedale chiefly for structural and sanitary uses, blackboards, bulletin boards, and standard roofing slate. Crude perlite, mined in Colorado, was expanded by Pennsylvania Perlite Corp. at its Allentown plant, primarily for use as building plaster aggregate.

The New Jersey Zinc Co. produced crude zinc ore from its Friedensville underground mine by the room and pillar method. The crude ore was processed and shipped by truck to the company smelter at Palmerton. Jasper, corundum, and quartz crystals were found in the county by gem and mineral collectors.

Luzerne.—The county ranked second in production of anthracite. Average value decreased from $9.18 per ton in 1961 to $8.41. Leading producers were Glen Alden Corp., Lehigh Valley Anthracite, Inc., and Jeddo-Highland Coal Co.

Luzerne County ranked second in production of sandstone; total output was 328,000 tons. Sandstone was produced at quarries near White Haven, Dupont, and Trucksville. Coolbaugh Sand & Stone Co., Inc., Dupont, installed two crushers to increase capacity and versatility at its plant.

Luzerne County was the leading sand and gravel producing area in northeastern Pennsylvania. Largest producers were Airport Sand & Gravel Co. Inc., Wyoming, and Frank B. Sgarlat Sand & Gravel Co., Forty Fort. Other sand and gravel operations were located at Hazleton, Drums, Avoca, and Nescopeck. All sand and gravel was used for construction.

Blue Ridge Soil Pep Co., Inc., recovered humus peat from a bog near White Haven. Pennsylvania Peat Moss, Inc., produced moss, reed-sedge, and humus peat from bogs near White Haven.

Miscellaneous clay and shale for building brick was mined by Hazleton Brick Co. near Hazleton. Quartz crystals were collected as mineral specimens.

Lycoming.—Lycoming Silica Sand Co. produced crushed limestone from the Lime Bluff quarry, Muncy, and the Pine Creek quarry, Jersey Shore, principally for concrete and roadstone. In addition, crushed limestone for agricultural purposes was produced at the Pine Creek quarry. Limestone was quarried solely for roadstone near Jersey Shore by Susquehanna Quarry Co. Haines Stone Co., Slate Run, produced dimension sandstone for flagging stone and rubble. Some ground slate was produced near Muncy.

Lycoming Silica Sand Co. processed sand and gravel for construction and industrial sand for molding, engine, and other uses near Montoursville.

Bituminous coal was produced at four operations (one underground and three strips). The underground mine reported 1,440 tons cut by hand and shot from the solid. Strip mines had 3 power shovels, 2 draglines, 3 bulldozers, 2 power drills, and 13 trucks. None of the coal produced was mechanically cleaned, but 31,960 tons was crushed at a loading tipple.

Tripoli (rottenstone) was quarried by Penn Paint & Filler Co., Antes Fort, and Keystone Filler & Manufacturing Co., Muncy. The crude material was crushed, dried, and ground for use as an abrasive filler.

McKean.—Plastic and burley fire clays were produced by Kness Brothers Producers near Mt. Jewett for manufacturing foundry refractories. Miscellaneous clay was recovered from an open pit at Lewis Run by Hanley Co. and used in a local plant for making building brick. A small quantity was sold for other uses. Industrial sand for blast purposes was produced by C. L. McGavern, Jr. near Eldred.

Mercer.—Bituminous coal was produced at 12 operations (1 underground and 11 strip). Production totaled 1.1 million tons, almost entirely from strip mines. The underground mine reported that all its tonnage was cut by two machines. The strip mines reported 19 power shovels, 14 draglines, 2 carryall scrapers, 16 bulldozers, 8 power drills, and 29 trucks or tractor-trailers. One preparation plant was active and used pneumatic equipment. Coal crushed totaled 433,800 tons, and some coal was treated with oil.

Sand and gravel for ready-mixed concrete and other construction uses was produced by Taylor Sand & Gravel Co. near Sharon. Other sand and gravel producers were Seidle Sand & Gravel Co., Mercer, and Transfer Sand & Gravel, South Pymatuning Township. Whitrock Silica Sand Co., quarried and crushed sandstone near Greenville for roadstone, furnace lining, riprap, abrasives, filler, play sand, and foundry uses.

Mifflin.—The Pennsylvania Glass Sand Corp. processed industrial sand near McVeytown for a variety of uses. Miller Silica Sand Co. processed sand for construction and industrial use near Burnham. George E. Miller Coal Co. processed sand and gravel near McVeytown

for building and paving. Sand for building was produced by James R. Klines' Sons near Lewistown.

Bethlehem Limestone Co. produced crushed limestone at its Naginey quarry near Milroy for blast-furnace flux, concrete aggregate, roadstone, and stone sand. George E. Miller Coal Co., Lewistown, produced limestone for concrete and roadstone. Honey Creek Lime Co., Reedsville, and Ehrenzeller Lime Co., McVeytown, produced crushed limestone for manufacturing lime. Ehrenzeller Lime Co. manufactured quicklime for agricultural purposes at its seven-draw-kiln plant near McVeytown. Honey Creek Lime Co. produced hydrated lime for agricultural purposes at its continuous hydrating plant near Reedsville. Quartzite was crushed and ground for making silica brick at the local plant of Haws Refractories Co. near Hawstone.

Monroe.—Limestone was produced by Hamilton Stone Co., Inc., at quarries near Saylorsburg and Stroudsburg for concrete, roadstone, and to a smaller extent for cement manufacture.

Javelyn Mobile Mix, Inc., acquired the sand and gravel business of Steward and Clyde White near Stroudsburg and processed the material for building purposes. Sheesley Minerals, Inc., produced sand near Kunkletown for use in concrete.

Universal Atlas Cement Division of United States Steel Corp. produced white clay near Kunkletown for use at its portland cement plant.

Humus peat was produced near East Stroudsburg by Pocono Peat Co. and sold in bulk. Fossil coral was collected as specimens near Stroudsburg.

Montgomery.—Production of stone in Montgomery County exceeded 4 million tons. Tonnage and value increased slightly, and the county continued to rank second in stone production. Two operators near Conshohocken and Norristown produced crushed limestone for concrete and roadstone. Quarries near Plymouth Meeting and Bridgeport produced crushed limestone principally for blast-furnace and open-hearth flux, concrete, roadstone, lime manufacture, and stone sand. Limestone quarried and crushed near West Conshohocken was used for manufacturing cement. Sixty-four percent of the limestone was transported by truck.

Dimension sandstone, for use as irregularly-shaped stone and rubble, was quarried near Norristown and Laverock. Fire Stone Products Co., Glenside, quarried dimension quartzite for use as linings (without further processing) in steel furnaces, and rubble. Basalt was crushed at quarries near Pottstown and Perkiomenville for concrete and roadstone. Montgomery Stone Co., Montgomeryville, produced dimension basalt for rough and dressed building stone and crushed basalt for roadstone. Gill Quarries, Inc., Norristown and Spring House, and M & M Stone Co., Harleysville, quarried a miscellaneous stone, argillite, solely for road material. A. Manero & Sons, Glenside, produced a miscellaneous dimension stone, mica-schist, for use as rough and dressed building stone. Granite was quarried near Bethayres for dressed stone, rubble, and crushed roadstone. Some dimension granite for use as rough building stone was quarried near Laverock.

Allentown Portland Cement Co. continued to operate its West Conshohocken No. 2 plant to manufacture portland and some masonry

cements. Finished cement was shipped to consumers mainly in bulk by railroad. G. & W. H. Corson, Inc., Plymouth Meeting, produced hydrated lime for construction, chemical, industrial and agricultural purposes.

Miscellaneous clay was produced by The Keller-Pottery Co. near North Wales for manufacturing flower pots. Plastic fire clay and shale was mined near Pottstown by Robinson Clay Product Co., to make vitrified sewer pipe. Miscellaneous clay and shale was produced near Norristown by Norristown Brick Co. for making building brick and near Trappe by Philadelphia Brick Co. for making flue and field title.

Sand for building purposes was processed by William Bambi & Sons, Inc., near Norristown. Refractory & Insulation Corp., Port Kennedy, and The Philip Carey Manufacturing Co., Plymouth Meeting, expanded perlite, shipped from Colorado, for insulation purposes.

Gem and mineral specimens collected included stilbite, natrolite, malachite, galena, zeolites, and quartz crystals.

Montour.—Limestone was quarried near Danville by Mausdale Quarry Co., for concrete aggregate and roadstone. Crushed and sized limestone was produced at a quarry near Milton by Lycoming Silica Sand Co. for roads and agriculture. A small quantity of sand and gravel was produced for building purposes by Thomas Sand & Gravel Co. near Danville.

Northampton.—The county led in total value of mineral output in the State, and cement was the major commodity produced. Value of cement shipments increased by 4 percent. Nine companies operated 11 plants and manufactured cement from captive limestone and purchased materials. Portland and masonry cements were produced. Most of the cement was shipped by rail, in bulk, to ready-mixed concrete companies and manufacturers of concrete products. Cement plants were located near Nazareth, Bath, Martins Creek, Northampton, Stockertown, and Bethlehem.

Northhampton County continued to rank first in stone production with a total output exceeding 5 million tons. Eleven firms produced limestone from quarries near Nazareth (four), Bethlehem (two), Northampton (two), Bath, Martins Creek, and Stockertown. Most of the captive limestone was utilized at company plants for manufacturing cement, but some was also used for concrete, roadstone, riprap, stone sand, agriculture, and railroad ballast. Northampton County was again the principal source of slate. Production increased 12 percent over that of 1961. Slate was recovered from nine operations at Pen Argyle (six), Bangor, East Bangor, and Bath. The processed slate was used principally for flagging stone, standard roofing, and structural and sanitary ware.

Consumers of sand and gravel for building and paving purposes were supplied by Houdaille Construction Materials, Inc., Portland; W. J. Lowe & Sons, Inc., Bangor; and Lehigh Valley Sand & Gravel Co., Inc., Easton. Some gem and mineral specimens were collected near Easton.

Northumberland.—Anthracite production totaled 1.6 million tons, a decrease of 15 percent from that of 1961. Average value per ton increased from $6.57 in 1961 to $7.54. Leading producers were Gap-Anthracite Co. and Reading Anthracite Co.

Watsontown Mineral Products Co. processed shale from stock for use as linoleum filler. Watsontown Brick Co. and Glen Gery Shale Brick Corp. produced miscellaneous clay and shale near Watsontown for the manufacture of building brick.

Limestone was quarried and crushed near Herndon for roadstone and agricultural use, and near Sunbury for lime manufacture. Clyde Starook, manufactured quicklime for agricultural purposes near Sunbury.

Perry.—Bradford Hills Quarry, Inc., quarried and crushed limestone at its Newport plant for concrete, roadstone, and screenings. Most of the stone was sold to the Pennsylvania Department of Highways and local townships for road construction.

Philadelphia.—The Liberty Corp. recovered sand and gravel for building material from a dredge along the Delaware River.

Atlantic Refining Co. recovered hydrogen sulfide by the Girdler system, using diethanolamine and monethanolamine. Gulf Oil Corp. recovered sulfur as a byproduct in the liquid purification of oil refinery gas by the Claus process.

Potter.—Dimension sandstone was produced from seven quarries near Austin, Oswayo, Wharton, and Roulette for flagging and other purposes.

Schuylkill.—The county ranked first in anthracite production, accounting for 37 percent of the total tonnage. Underground mines, strip pits, and culm banks were operated during 1962. Leading producers were Reading Anthracite Co., Greenwood Stripping Corp., Honeybrook Mines, Inc., and Gilberton Coal Co.

Huss Contracting Co., Andreas, and Pennsylvania Aggregates, Inc., Summit Station, quarried and crushed limestone for use as roadstone. Harbison-Walker Refractories Co. quarried and crushed quartzite at its Andreas quarry for use in manufacturing silica brick. Industrial sand for furnace use and sand for paving purposes was processed by Refractory Sand Co., Inc., near Andreas. Schuylkill County continued to be the leading miscellaneous clay producing county. Various producers supplied the Lehigh Materials Co. with shale for use in its lightweight aggregate plant. Auburn Brick Co. used its entire output of miscellaneous clay and shale to manufacture building brick near Auburn.

Snyder.—Limestone for concrete, roadstone, and riprap was quarried and crushed near Middleburg by National Limestone Quarry. Crushed limestone solely for lime manufacture was quarried by Carton L. Comfort near Mount Pleasant Mills. Quicklime for agricultural purposes was manufactured at the six-pot-kiln lime plant. Sand and gravel for building and paving was processed by Central Builders Supply Co. near Sunbury. Paxton Brick Co. used miscellaneous clay and shale mined from an open pit near Paxtonville for manufacturing building brick.

Production of anthracite from dredging operations in the Susquehanna River continued to decline.

Somerset.—Bituminous coal was produced at 117 operations (81 underground, 35 strip, and 1 auger). Production totaled 2.4 million tons. Underground operations reported 6 continuous miners, 1 mobile loader, 2 self-loading conveyors, 53 hand-loaded face conveyors, and 94 cutting machines. A total of 88,400 tons was cut by hand and shot

from the solid underground. Strip mines reported 62 power shovels, 36 draglines, 67 bulldozers, 21 power drills, and 138 trucks or tractor-trailers. Four preparation plants were active and cleaned 277,400 tons of coal using jigs, chance cones, heavy media, and pneumatic equipment. Coal crushed totaled 1.1 million tons, and coal treated totaled 127,300 tons.

Somerset Limestone Co., Inc., Bakersville, quarried and crushed limestone for concrete and roadstone. Keystone Lime Co., Springs, quarried and crushed limestone for roadstone and for agriculture. Crushed sandstone for concrete and roadstone was quarried near Springs by Rodamer Concrete Products.

Flint fire clay for the manufacture of firebrick and block was produced at three open-pit operations of General Refractories Co. near Rockwood and Fort Hill. Plastic fire clay was produced near Springs by Otto Brick & Tile Works for making building brick and from an underground mine near Hollsopple by Hiram Swank's Sons, Inc., for refractories. Sand for general purposes was recovered near Boswell by Robert Shaulis and Boswell Sand Co.

Sullivan.—Anthracite was produced by Bliss Coal Co. at an underground and strip mine and by E & B Coal Sales at a strip mine.

Susquehanna.—Dimension sandstone (bluestone) quarries, mostly for flagging were operated near Harford, Springville, Fort Washington, and Kingsley. Crushed sandstone for road material was recovered near Clifford by Keelor Supply Co., Inc. Susquehanna Quarry Co., a new producer near Montrose, produced crushed sandstone for road material. Anthracite was produced at the Forest City bank by Matisko Coal Co. and prepared at the Waddell Breaker.

Tioga.—Bituminous coal was produced at six operations (one underground and five strip). The underground mine produced 9,960 tons of coal by hand methods using two drills. The strip mines had 17 power shovels, 8 draglines, 14 bulldozers, 3 power drills, and 12 trucks or tractor-trailers. None of the production was cleaned mechanically, but 209,450 tons were crushed. Dimension sandstone was produced by Lyle R. Robinson in Elk Township, mainly for flagging.

Union.—Faylor Lime & Stone Co. produced crushed limestone near Winfield for concrete, roadstone, and agriculture. John L. Iddings produced crushed limestone near Mifflinburg for concrete and roadstone.

Venango.—Bituminous coal was produced at six strip operations. Production totaled 295,370 tons. Equipment used included 10 power shovels, 4 draglines, 1 carryall scraper, 12 bulldozers, 3 vertical power drills, and 5 trucks or tractor-trailers. A small quantity of coal was cleaned in a nearby county. No preparation facilities were active.

Industrial sand was produced near Utica by Pennsylvania Glass Sand Corp. for molding and furnace uses. Oil City Sand & Gravel Co., Oil City, reported output of sand and gravel for construction. Bank-run gravel production was reported by White City Sand & Gravel Near Titusville. Mrs. Ralph Vincent produced gravel, processed and bank-run, at Franklin for construction.

Warren.—General Concrete Products Corp. prepared sand and gravel for construction and industrial sand for smelting uses from a dredge along the Allegheny River near Warren. Sand and gravel also was

processed by Warren Sand & Gravel Co., Inc., Oil City, and by Nelson & Ellberg, Warren, for construction.

Washington.—Bituminous coal was produced at 39 operations (19 underground, 18 strip, and 2 auger). Production totaled 10.9 million tons, of which 92 percent came from underground mines. Washington County led other coal-producing counties in total coal produced and total underground coal produced. Underground mines produced 7.2 million tons using 72 continuous miners with 10 mobile loaders and 2.8 million tons using 69 mobile loaders. Forty-five cutting machines cut 2.8 million tons of coal. Strip mines had 31 power shovels, 8 draglines, 4 carryall scrapers, 29 bulldozers, 17 power drills, and 64 trucks or tractor-trailers. Auger operations reported two augers and one bulldozer. Nine preparation plants cleaned 8.3 million tons of coal, 2.4 million tons by jigs and 5.9 million tons by wet washing other than jigs. Coal crushed totaled 5.3 million tons, and coal treated with oil totaled 962,200 tons.

Limestone was quarried near Washington by Washington Stone Co. for concrete and roadstone. Fry Coal & Stone Co., Division of Martin Marietta Corp., operated a sandstone quarry and portable plant near Claysville for concrete aggregate and roadstone.

Wayne.—The county led in peat production which increased 20 percent over that of 1961. Reed-sedge and humus peat was recovered from bogs near Gouldsboro by Wayne Peat Humus Co.

Sandstone was quarried and crushed near Lake Ariel by Wayne Concrete & Sand Works, Inc., for concrete aggregate and roadstone. W. R. Strong & Son produced dimension sandstone for flagging and rubble. Sand and gravel was produced by Keystone Pavement & Construction Co., Inc., Lake Ariel, for black top paving uses, and by Willis R. Black, Lake Ariel, for farmers' building or repairing and to cover the township dump.

A small quantity of anthracite was recovered by strip mining. Masters Contracting Corp. operated the Browndale strip prepared the coal at Bolands breaker.

Westmoreland.—Bituminous coal was produced at 67 operations (42 underground, 24 strip, and 1 auger). Underground production totaled 3.4 million tons using 22 continuous miners with 15 mobile loaders, 28 mobile loaders, 7 hand-loaded face conveyors, and 46 cutting machines. Strip production totaled 161,000 tons and reported 31 power shovels, 7 draglines, 3 carryall scrapers, 29 bulldozers, 5 power drills, and 9 trucks or tractor-trailers. Seven preparation plants were active and cleaned 2.8 million tons of coal by jigs, other wet washing methods, and pneumatic methods. Coal crushed totaled 2.4 million tons, and coal treated totaled 1 million tons.

Limestone was quarried and crushed by Reischneider Bros., Lower Burrell, and Penn Aggregates, Jeannette, for roadstone. Westmoreland County continued to lead in the production of sandstone. Lynns Quarry, Belle Vernon, produced dimension sandstone for flagging. John C. Beaumont, Belle Vernon, produced dimension stone for rubble. Sandstone quarries were operated near Lycippus, Murrysville, and Baggaley for concrete and roadstone material. Latrobe Construction Co., Ligonier, operated an underground sandstone mine for roadstone. The company installed a new ventilating system.

Wyoming.—Sand and gravel was recovered by East Falls Sand &

Gravel, Falls, for building and paving. Wyoming Sand & Stone Co., Falls, produced sand and gravel for building and paving and industrial sand for engine use. J. G. Robinson, Inc., Fort Washington, produced dimension sandstone for flagging.

York.—Medusa Portland Cement Co., York, quarried and crushed limestone for manufacturing waterproof white and gray portland cements and some masonry cement, using the dry process. New facilities, costing $7 million, were being constructed at the York white cement plant of Medusa Portland Cement Co. and included a 450-foot-long rotary kiln, concrete storage silo, kiln feed tank, grinding mill, and burner buildings. When placed in operation, the new plant would approximately double the present productivity capacity. The original installation, built in 1907, was claimed to have been the first white cement plant in the world. J. E. Baker Co. manufactured dead-burned dolomite for refractory use at its York plant from dolomite the company quarried nearby. The stone was also sold for roadstone and agricultural use.

Limestone was quarried by Lincoln Stone, Inc., Thomasville, for roadstone and railroad ballast; York Stone & Supply Co., York, for roadstone and asphalt filler; Thomasville Stone & Lime Co., Thomasville, for metallurgical flux, cement, agriculture, glass, whiting, miscellaneous fillers, mineral food, and roadstone; National Gypsum Co., York, for floor covering, agricuture, roadstone, and metallurgical flux; White Pigment Corp., York, for miscellaneous chemical uses and fillers for paint, putty, rubber, carpets, abrasives, asbestos, caulking, ceramics, crayons, and gypsum board; and Standard Concrete Products Co., Inc., York, Klines Quarry, Inc., Wrightsville, and Cordorus Stone & Supply Co., Inc., Emigsville, for roadstone. Slate was crushed and ground for roofing granules near Delta by The Ruberoid Co.

Sand and gravel was produced by Pennsy Supply, Inc., York Haven, and Sherrill Sand Co., Mount Wolf, for construction. Neuman Sand & Supply Co. processed sand for brick facing and building near York.

Medusa Portland Cement Co. produced miscellaneous clay and shale near York for manufacturing portland and other hydraulic cements. Glen Gery Shale Brick Corp. produced miscellaneous clay and shale near York for manufacturing building brick.

General Mining Associates, Glenville, remained the only mica producer in the State. The scrap mica was processed by drying and air separation and was sold for use in paints, rubber, plastics, and welding rods. Pennsylvania Perlite Corp., York, expanded crude perlite, shipped from Colorado, mainly for use as building plaster aggregate.

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